BE PREPARED! A Y2k Monitoring Post

Volume 18, No. 11 November 1999

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Your Personal Communications Source

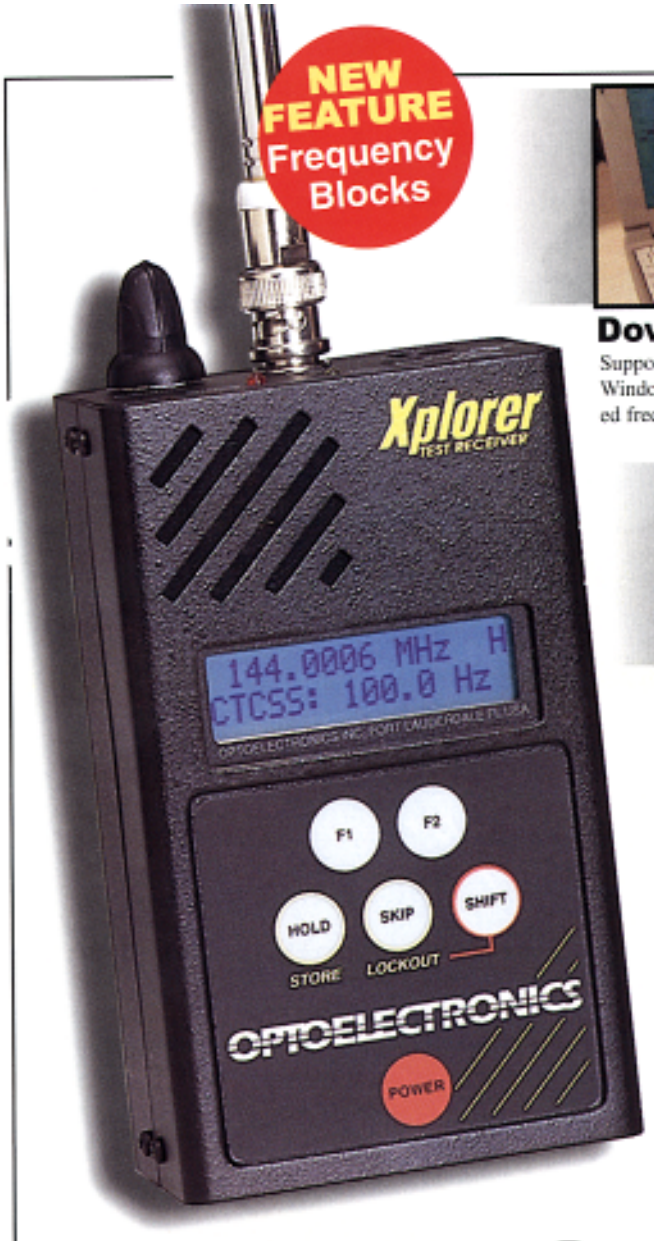


Homing in on Beacons

NEW! Internet-delivered MT EXPRESS (Page 5)

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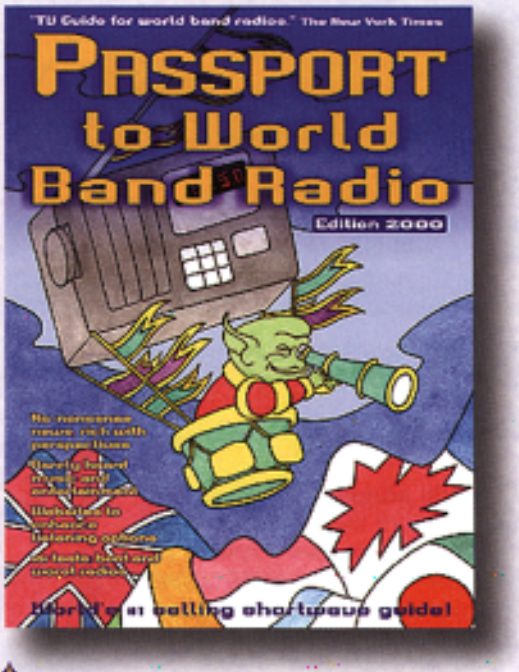
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Monitoring Times

Vol. 18, No. 11 November 1999



Cover Story

Homing in on LF Beacons

By Ralph Craig

An obscure, but fascinating radio target for radio hobbyists and aviation buffs can be found tucked into the most unlikely places. Nondirectional homing beacons used for aero and marine navigation can be found scattered throughout the countryside and coastline. On your radio you can find them between 190 to 530 kHz.

Since beacon signals travel primarily by groundwave, it is a challenge to build a large list of interceptions. At least identification should be easy – that's about all they transmit!

Pictured on our cover is a 60-ft vertical antenna with an impressive "top hat," photographed by the author near Montgomery, Ohio.

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A Quadraform LF Loop Antenna 14

By Richard Marris

Loop antennas are famous for their directional characteristics and they are widely used for mediumwave DXing. However, this author has designed a loop especially tailored to the low band between 120 to 220 kHz – great for picking up beacons, the new 136 kHz amateur band, 1750 meter experimental band, and some European longwave broadcasters.

TIS - The Original Microbroadcasters 20

ByPatrick Griffith



Traveler's Information Stations are like a dare to the DXer! These tiny stations are extremely low-powered in order to pass news or information of immediate interest to listeners passing through the reception area.

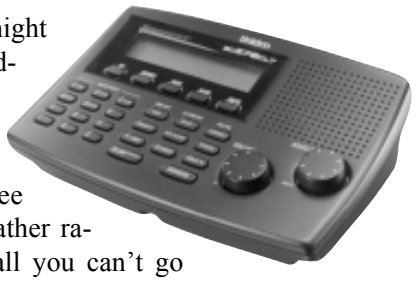
Monitoring Strategies for Y2k 24

By Haskell Moore



An appropriate subtitle for this feature could be "planning ahead for emergency monitoring." What issues and equipment need to be considered regarding emergency radios, emergency power, emergency antennas, etc? If Y2k brings no nasty surprises, you can generally count on Mother Nature to fill in.

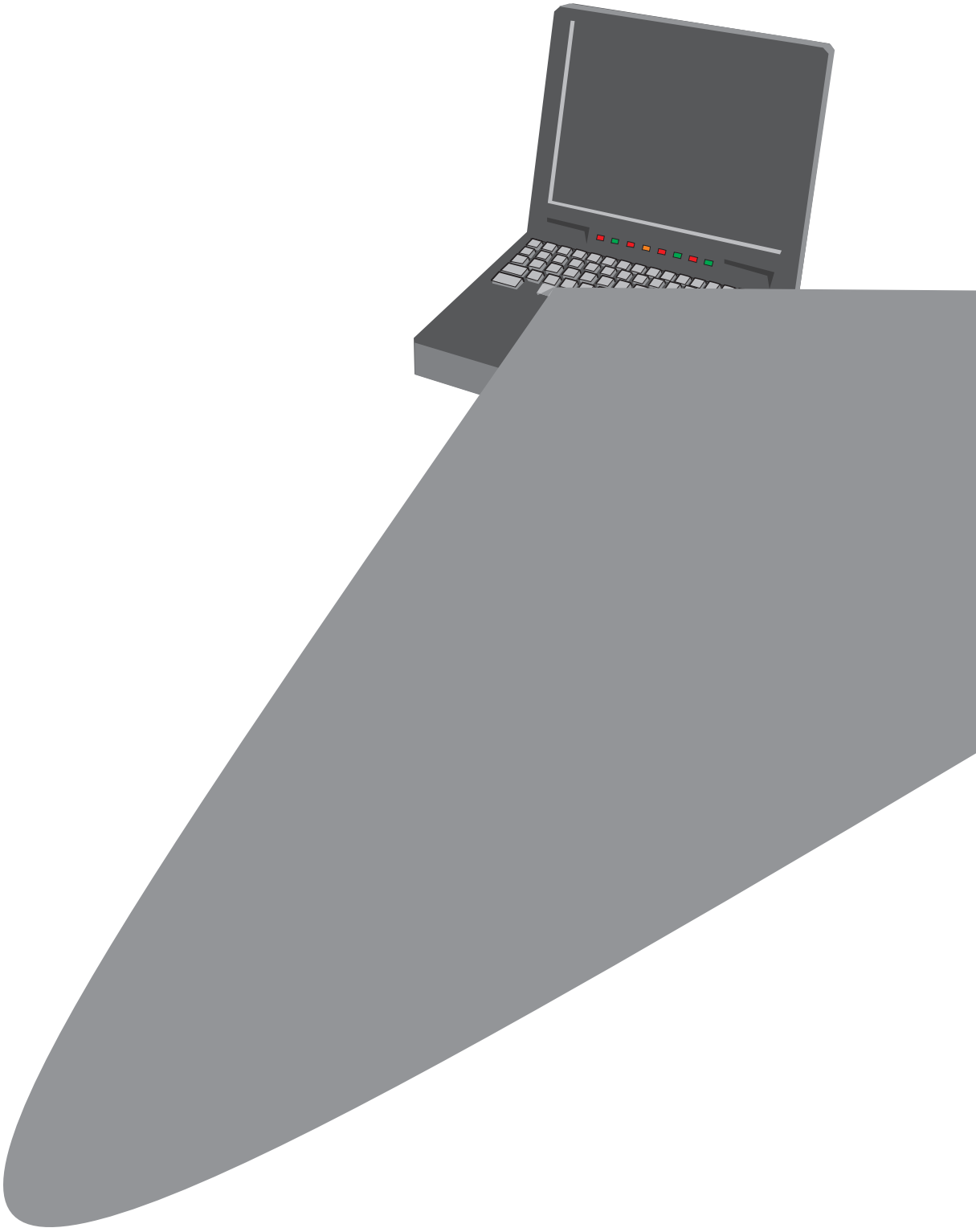
Reviews:



Uniden knows the way you scan – all night long! The **Uniden BC278CLT** ends the bedside clutter; it's a scanner, AM-FM radio, and alarm clock (see p.96). For a weather radio that has it all you can't go wrong with the **Oregon Scientific WR-102** handheld (see p.91). We continue our look at computer-based receivers with a look at the shortwave performance of the wideband **Icom IC-PCR1000** (see p.94)



Homebrew for Christmas? It's not too late to put together a classy, personalized clock with inner workings from Klockit (see p. 105).



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SCANCAT GOLD for Windows "SE"

Sin

How Safe are You?

The Federal Emergency Management Agency has a website that will tell you how prone your area is to natural disasters. Go to **www.esri.com/hazards**, click on online hazards map, enter your zip code, city and state or congressional district. You can find out whether the area has experienced hurricanes, tornadoes, hailstorms, floods, etc.

Then, to find out how to be better prepared, go to **www.fema.gov/impact/**

FCC Mediates CALEA

Like fictional character Captain Jean-Luc Picard's orders to "make it so," Congress frequently passes legislation others have to implement. The Communications Assistance for Law Enforcement Act (CALEA) of 1994 is a case in point.

It took the Federal Communications Commission mediating between the Justice Department, Federal Bureau of Investigation, and the telecommunications industry to work out how to satisfy the requirements of the congressional Act without violating citizen's privacy or burdening the industry. The FCC's August order allows law enforcement agencies to obtain (with a court order) a cellular phone user's location at the beginning and end of a call, and it impacts other issues such as wiretapping of digital and conference calls. The orders are to be implemented by Oct 1, 2001. (The original deadline was October 1998.)

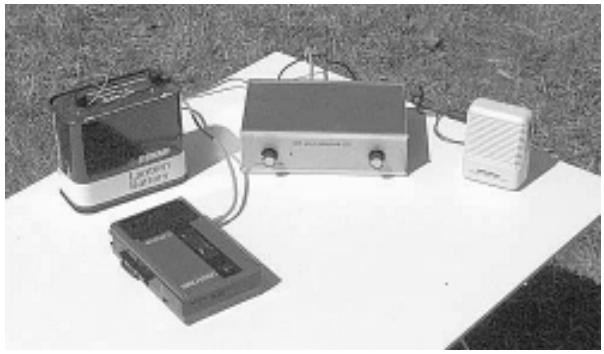
Deep Space Overload

Trying to call home from deep space and still getting a busy signal? NASA's Deep Space Network is the "switchboard" that connects two dozen probes with earth stations that send out daily control commands and it receives data and images from throughout the solar system and beyond. Already overbooked with projects, the network is expected to handle traffic from another 27 missions by 2008.

To stave off construction of expensive new earth stations, spacecraft are being designed to be much more self-sufficient and to use higher (faster) transmission frequencies in the Ka band.

It's Jupiter, by JOVE!

Radio JOVE (**http://radiojove.gsfc.nasa.gov/**) is a collaborative research effort that teams teachers and students to hear radio sounds from Jupiter and the sun. Not only do they listen, but they also help to build the equipment – NASA provides the radio



telescope pictured in kit form for $100.

Several spacecraft have monitored these radio emissions, and now *Galileo* is in orbit around Jupiter. In mid- to late 1999 and again in late 2000, scientists and observers around the world will collaborate as a part of International Jupiter Watch (**www-ssc.igpp.ucla.edu/IJW/**) as *Galileo* crosses the orbit of Jupiter's moon Io. Ground-based observations provide different perspectives on the same event. Thus, students using simple, inexpensive radio receivers can participate in the scientific process by collecting, comparing, sharing, and analyzing data.

Radio observations of Jupiter must be made at night when the Sun's effects on the Earth's ionosphere fade away, but the equipment can also be used for daytime observations of solar radio phenomena.

Schools interested in participating in Radio JOVE may fill out an application available on the web site, or request one by fax to James Thieman, Goddard Space Flight Center 301-286-1771.

Jury Still Out on Cancer Link

In 1992, a report by researcher Richard P. Liburdy of the Lawrence Berkeley National Laboratory provided the first scientific indication of a link between certain cellular changes and electromagnetic fields around power lines. However, recent investigation has revealed that Liburdy eliminated data which contradicted his conclusions.

The issue is far from over, even though Liburdy's report has been discredited. Liburdy still stands by his original conclusion, and three independent scientists support his evaluation of the facts. However, subsequent studies have not been able to reproduce similar results. Still, the National Institute of Environmental Health Science has said that the electromagnetic fields around power lines "cannot be recognized as entirely safe."

Radio Gun Still Dangerous

At an information conference a few months ago, former Navy engineer David Schriner aimed a homemade "gun" made from a parabolic reflector, a horn antenna and two automotive ignition coils at two personal computers about 20 feet away. When the contraption was connected to a car battery, the PA system buzzed and one computer instantly dropped out of its screen saver mode. When the device was switched off, both PCs were frozen and wouldn't respond to keyboard input.

The effects of High Energy Radio Frequency (HERF) emissions on electronics are well known, but Schriner has been sounding a wake-up call for the past several years. Although military aircraft are built with hardened electronics, Schriner theorized that a single nuclear weapon designed specifically for the purpose, "would probably take out all of the electronics on the East Coast."

Even low-budget saboteurs can create viable electronic weapons, based on technology dating back to inventor Nikola Tesla, essentially pushing a 20 megawatt burst of radio noise through an antenna.

The computers targeted in Schriner's demonstration worked fine after rebooting, and he said permanent damage is uncommon. "But if that happens to be a computer in a tank, or in a piece of medical equipment, how long does it take to reboot? . . . By that time you could be dead."

World's Northernmost Pirate?

North of the Arctic Circle the little town of Arctic Village, Alaska, is making plans for a radio station – with or without the permission of the Federal Communications Commission. Joseph Tritt, chief of the Venetie tribal government, says he's tired of repeating local news and information by word of mouth. A 100-watt station is all that's needed to cover the town of 245 people, but you can't get a license to operate on such low power without a waiver from the FCC.

The tribal council hasn't decided if it will file for a waiver or not – they argue that they own not only 1.8 million acres of land, but they own the airspace above it. Airspace has been federally regulated since 1934 when the FCC was created.

Even if the station broadcasts as an unlicensed "pirate," the FCC is unlikely to move against them – the agency generally does not act unless it receives a complaint or the station broadcasts near air traffic control frequencies.

Playing Chicken with Security

A flurry of faxes were sent to New Zealand in anticipation of President Clinton's visit in conjunction with the Asia-Pacific Economic Cooperation (APEC) meeting in Auckland. However, those faxes were being received not by US security personnel, but by Saji Philips at his Poultry Pride chicken-processing plant in South Auckland, according to a story in *The New Zealand Herald*.

Faxes included detailed information on the installation of White House communications equipment in the airport control tower, and names and car registration details of military communications officials. In spite of being assured the problem would be fixed, it continued over several weeks.

Congress has objected to the huge bill being run up for security procedures to protect the President on his overseas jaunts – maybe they should also ask if they are getting their money's worth!

According to the report on the Scan-L listserve, Auckland police had planned to have a TETRA digital trunked radio system running in time for APEC, but it didn't materialize. Instead a 418-420 MHz MPT1327 trunking system with rolling code inversion scrambling was installed to provide communications during the meeting.

Police Data Link

Illinois has leased special bandwidth from cellular phone companies for the next five years to operate a new communications tool called the Illinois Wireless Information Network. This will allow state police to use laptop computers that should let them check pictures of missing children, check tag numbers, or file reports without ever leaving the squad car.

The lease is the first of its kind in the nation, and it will create the nation's biggest wireless data network for law enforcement, said state police deputy director DaRosa. The down side is the cost to departments – $9,000 for the laptop computer, plus $1,000 hookup fee and $42.25 a month. Other agencies are interested, but many have already stretched their budgets to pay for new radio systems.

Longest Running Drama

John Figliozzi says, "Many would probably be surprised to learn that the longest running drama on radio is *Unshackled*, produced by the Pacific Garden Mission of Chicago and broadcast by, among others, HCJB and WWCR."

Unshackled began its 50th season in September and is broadcast in English, Romanian, Polish, Spanish and Arabic on some 1,200 radio stations in more than 140 countries, as well as on the Internet (**www.unshackled.org**). The half-hour show dramatizes testimonies sent in by people whose lives have been changed after finding Christ.

Bill Pfeiffer Killed in Car Accident

Bill Pfeiffer, The Old Time Radio Digest Roundtable mail-list administrator and also moderator of rec.radio.broadcasting, died Sept 1 in a car accident. Bill has been moderating rec.radio.broadcasting since 1991. His passion for broadcast was evident in all that he did. His forum supported DX-related postings, and his web site supported a number of history-related pages of interest to the domestic-band DXer.

The future of his newsgroup was unknown at presstime. Those interested can email Alan Freed *alan@ beatworld.com* for updates.

Communications is composed by Rachel Baughn, editor, from material submitted by our readers. This month's reporters include: Anonymous, Albany, NY; Anonymous, Austin, TX; George Antunes, Houston, TX, via <michaelr@ionet.net>; Gerald Brookman, Kenai, AK; Dean Coon, Fairbanks, AK; Chet Copeland, Wash, DC; Ian Julian on Scan-L via Roger Cravens, Atlanta, GA; Warren E Eggers; Charles Howard Jr, Tampa, FL; Kevin Klein, Neenah, WI; Doug Robertson, Oxnard, CA; Ed Schwartz, Chicago, IL; Doug Smith, TN; Cleve Svetlik, Pepper Pike, OH; Larry Van Horn, Brasstown, NC; JT Ward; Dave Zantow, Janesville, WS

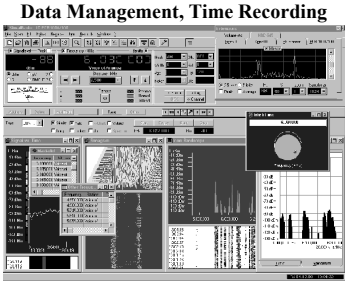
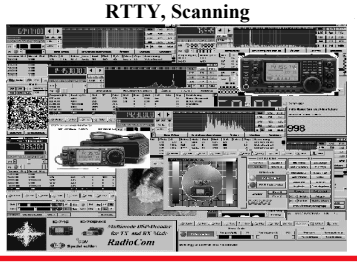
BULLETIN BOARD

(See www.grove-ent.com/hmpgmt.html for more events and club info)

Nov 6-7: Lawrenceville, GA
Alford Memorial RC hamfest at the Gwinnett Co Fairgrounds, Talk-in 145.45- (PL107.2), 444.25+ (PL131.8), 146.76- (PL107.2). Huge fleamarket, vendors, contests, forums. For info email *hamfest@totrbbs.radio.org*, visit **http://www.totr.radio.org** or call 770-410-3989 or write PO Box 1282, Stone Mountain, GA 30082-1282

Nov 6: Belleville, IL
First annual Scott Composite ARS hamfest at Belleville Area College (Carlyle Road-Rt 161 and Green Mount Road at the main campus); talk-in 147.120. Gen admission 8a.m.-2p.m.. $4. Refreshments, prizes, workshops on emergency comms and CAP. VE testing; must preregister. Contact Skip Mize KA9VKE *fiuinc@peaknet* or 618-277-9767

Hobby News:
• Stephen Newlyn, VK5VKA, says, "After 26 years the Southern Cross DX Club has closed down due to a lack of administration staff and a decline in membership."
• *Pete Costello's Radio Catalog*, the best-known of several sites and email groups maintained by Jay Novello, has a new address – **http://havana.iwsp.com/radio/**
Shortwave Radio Loggings - **http://havana.iwsp.com/radio/samples/**
Cuban Radio Samples - **http://havana.iwsp.com/music/**
Jay's page of radio links - **http://havana.iwsp.com/jay/radio/**
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Homing in on LF Beacons

By Ralph C. Craig, AJ8R

The excitement builds during my Saturday morning monitoring session. As I tune my receiver through the frequencies where normally I hear nothing but the heterodyne squeals and "hash" of interference, several stations are in the clear, easily readable. Quickly I copy the coded identification letters, noting the operating frequency, and characteristics of the stations.

Retrieving past copies of *Monitoring Times* from my "library," I check the "Below 500 kHz" column. There each month in a sidebar are listed stations throughout the United States and off shore that have been received by contributors. Three of the stations I have just heard are found there: two are in Texas, the other is located in Maine. They are added to my "heard list" and I start to write "requests for confirmation" letters (QSLs), hoping to add them to my list of stations with confirmed reception .

These stations that I and hundreds of other *Monitoring Times* readers listen to are known as beacons. Located below the standard broadcast band in the frequency spectrum designated as LF (low frequency), also known as the beacon band, are hundreds of radio transmitters that can provide an exciting and challenging monitoring experience. Radio waves emitted by these transmitters do not follow the pattern of those in the medium and short wave frequencies. Propagation is primarily by ground waves with limited range.

Increasing interest

When I first began listening, I was a casual monitor, but as my interest in beacon reception increased so did the number of questions I had concerning them. What is the purpose of these beacons? Who operates them? What do they look like? What are their technical parameters? How do their signals radiate?

Research was begun to find the answers to these questions. This article will provide answers to these and other questions, provide information on the technical aspects, and take you on a visit to a beacon site. It will provide little known information to the serious beacon listener and stir up interest in those who have never enjoyed the pastime of beacon DXing.

In the United States all beacons, with the exception of the very few operated by the military, come under the jurisdiction of the US Department of Transportation. The United States Coast Guard has responsibility for operation and oversight of beacons intended for navigation of marine traffic, while the Federal Aviation Agency (FAA) has like responsibility for those used in air navigation. As the FAA has by far the largest number of operational beacons, this article will present information concerning the aviation industry.

Development

Radio beacons, known in the FAA as NDBs (Non Directional Beacons) were the very first navigation aid that could be used by pilots to establish fixes on known points without regard to weather conditions. Visual contact with the ground or with the earliest types of aids (airways beacons using flashing or rotating lights) could be obscured by fog or clouds. Radio waves easily penetrate clouds and even the densest fog. Thus navigation in foul weather became common; no longer were aircraft delayed or flights canceled.

Beacons have been in use for over seventy-five years, and even though other sophisticated navigation aids (VOR, TACAN LORAN) are in use, radio beacons remain an essential aid to air navigation.

Here's the basic principle of operation: When a receiving antenna is formed into a small coil (loop) it will have a reception pattern consisting of a peak (or maximum) off of the end plane of the coil, and a null (or minimum) directly off of the broad side. (Ferrite rod antennas have exactly the opposite characteristics.)

In use, the loop was connected to a radio receiver tuned to a beacon's frequency. The loop was then rotated until a null occurred in the signal, which indicated the bearing to the station. The aircraft was then turned to this bearing. Keeping the aircraft on this new heading of "0," the pilot homed on the beacon (thus the "H" – homing – in the FCC's classification of beacon signals).

This worked fine for a slow moving aircraft. As the speed of the aircraft increased, this method became impractical, and the Automatic Direction Finder (ADF) was developed. The ADF automatically tracks the beacon and, by means of a dial in the cockpit, constantly displays the bearing of the beacon to the pilot. When the aircraft is directly over the station, a 180 degree reversal of bearing occurs. Thus the pilot knows his exact position.

Beacon Classes

Air navigation beacons fall into three broad divisions. The first includes those beacons owned and operated by the FAA, the second, those operated by local governments (state-county-city), and the third, those operated by private organizations (airports-farms-ranches-off shore oil rigs). The last two must meet the same standards set for the FAA's beacons and are inspected periodically by FAA technicians.

Ownership of an NDB cannot be determined by listening to its identification code. Therefore it is difficult to find an address where a verification of reception request might be sent. One suggestion is to send a request, along with an enclosed self-addressed, self-stamped



Springfield, OH, "CCJ," 341 kHz. Old style MH with inverted "L" antenna, 250 feet between poles. FAA owned, 5 miles from airfield.



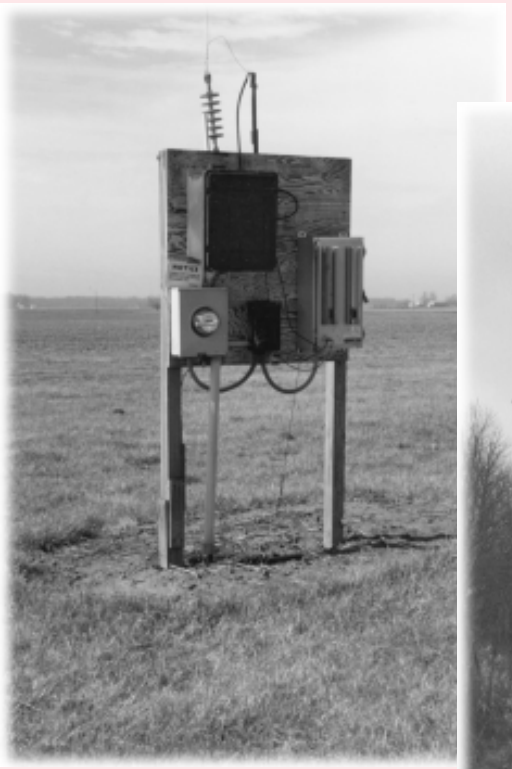
Madiera (Cincinnati), OH, "MDE," 379 kHz. Self supporting vertical antenna approx 60 feet tall. Capacity hat is 25 feet in diameter. Facility is located in one "leaf" of a cloverleaf interchange on the Ronald Reagan highway, 200 feet from the Montgomery, OH, business district.

Winchester, IN, "AWW," 212 kHz. Privately owned, low cost, simplest type of MH. Equipment on exposed mount, antenna flat top "T" between TV type masts.



Portland, IN, "PLD," 257 kHz. Typical privately owned MH, on field, 200 foot flat top "T" antenna.





Winchester, IN, "AWW" 212 kHz. Transmitter is in small silver box, antenna matching unit is black box.





Wilmington, OH, "IL," 407 kHz, Modern privately owned LOW/OM. Equipment in small white building, flat top "T" antenna 75 feet long. "V" yagi array for 75 MHz OM.

Dayton, OH, "AT," 315 kHz, LOM/OM. Old style FAA owned. Equipment in trailer. 50 foot flat top "T" antenna. "V" shaped Yagi array is 75 MHz OM antenna. "Bird house" on pole is monitor for OM.

reply envelope, to the FAA Electronic Field Office nearest the NDB location. An FAA Electronics Field Office Supervisor has told me that he returns such verification if the information was complete, both for beacons under his control and non-FAA facilities with which he was familiar.

Four classes of NDBs exist. The first, known as HH (high power homing), are high power stations used mainly for over-water navigation. They have large antennas and power output may exceed 2000 watts. There are few of these. The best known is TUK, 194 kHz, Nantucket Island, Massachusetts, that runs over 2000 watts and has an antenna tower over 300 feet tall. Another HH facility is GLS, 206 kHz, Galveston, Texas.

The second class is the H (homing) with output power of 50 to 1999 watts. There are also very few of these. Most NDBs fall into the third class, MH (medium power homing), with power of 50 watts or less.

The fourth class, known as compass locator or locator outer marker (LOM), operates with a power of less than 25 watts. LOMs are easily identified by the listener as will be described later in this article.

Comparing the received signal strength of any two beacons is difficult. The output power of each NDB is set by the flight inspection aircraft during commissioning of the facility. Power output is adjusted to provide the proper coverage needed for air traffic control. Thus two NDB facilities may vary widely in power output.

Beacon Types

The operating frequencies of NDBs are in the LF Band of 190 kHz to 530 kHz, with a window for the marine Morse code (CW) band from 435 to 500 kHz. Most of the NDB transmitters are of the conventional double side band (DSB), amplitude modulated (AM) type with oscillator and power amplifier.

However, there is in limited use a transmitter that uses a type of single side band (SSB) modulation. The main carrier is generated at the assigned frequency. A second, low power carrier, 1020 Hertz higher in frequency, is keyed on and off in Morse code using the station's identification. Both carriers are radiated from the same antenna resulting in a full carrier SSB signal. All transmitters operate with a frequency tolerance of .01 percent.

Because of the low frequencies used by the NDBs, the wave length of the signal is very long – 1840 to 5180 feet. Practical antennas for these stations are therefore very much shorter than the desired quarter wave. Large loading coils at the base, and capacity "top hats" are used to increase their electrical length. "Top hats" are not intended as radiators but are a way of electrically lengthening the radiating portion of the antenna.

All NDBs radiate a vertically polarized signal from a vertical antenna, 20 to 300 feet in height. The exact height is determined by the service area of the beacon. The most common type is one that has several interconnected wires 50 to 200 feet long connected to the top of the antenna forming the "top hat." This type of antenna is known as Flat-top "T".

Vertical, self-supporting antennas of various sizes with "top hats" made of tubular radials are also in use. Some are quite large (see photos).

Because of their relatively small size, the radiation resistance of an NDB antenna is very low, typically less than 2 ohms. Therefore they are very inefficient radiators. Some transmitters include a servo driven antenna tuning unit that automatically compensates for variation in antenna loading due to precipitation, antenna icing, etc. All NDBs have a very extensive ground radial system.

Identification Method

In the United States all NDBs are identified by two or three characters sent by Morse code, usually in 1020 Hertz tone (MCW, modulated cut wave). Each HH, H, or MH is assigned a unique three character code not duplicated at any other location.

Locator outer markers, however, utilize a different system. The LOM is part of an instrument landing system (ILS) located on a particular runway. The ILS has its own unique three-character identification code. The LOM identification is formed by using the *first two* characters of the ILS identification. For example, the Dayton, Ohio, runway 6L ILS identification code is ATD: therefore, the LOM at 315 kHz is AT.

Although you can identify the low power LOM beacons by their two character identification code, under this system it is possible for two LOMs to have the same identification characters. For example, Wilmington, Ohio, LOM operates on 407 kHz and has the identification "IL." Wilmington, North Carolina, operates on 281 Hz and also has the identification "IL."

Therefore, to positively identify the location of the LOM beacon received, *both* the identification characters *and* the operating frequency must be known. (This applies only to US aviation beacons. US Maritime and Canadian beacons use different systems.)

NDBs also carry other information at selected sites. In Alaska, and at a very few stateside sites, a service called TWEB (Transcribed Weather Broadcast) provides information on weather conditions at several selected cities.

Some beacons located at or near non-ATC-controlled airports carry the Automated Weather Observation System (AWOS). AWOS features a computer-generated voice giving the current weather conditions at that particular airport: for example, BNR, 209 kHz, at Benton Ridge (Findlay) Ohio.

"Super" H TUK, 194 kHz, (Nantucket Massachusetts) has Automatic Terminal Information System (ATIS) providing weather *and* landing information at several selected airports. While these all sound similar, there are subtle differences.

A Flexible Service

The location of all NDBs is determined by their intended use for air traffic control. Consequently they can be found almost anywhere. The HH beacons intended for over-water navigation are located close to the sea coast. Those of the MH class are located either on the airfield, or off the end of a runway up to several miles from the field. LOMs are always collocated with the Outer Marker (OM) of the ILS system approximately 5 miles from the approach end of the runway and on its extended centerline.

My visits to NDBs have found them in rural farm fields, thickly settled urban locations, in an industrial park, on air fields, and one in the business center of a city, (see photos).

During 1998 the Coast Guard completed the conversion of selected maritime beacons to provide Differential Global Positioning System (DGPS) information to ships. There are a limited number of these stations located at strategic points on all three coasts and the Mississippi river valley. All of the other maritime beacons were decommissioned.

Also in 1998, the Ground Wave Emergency Net (GWEN) transmitters, operated by the United States Air Force with frequencies in the middle of the beacon band, were decommissioned.

DXing Beacons

Listening for distant beacons, or DXing, is somewhat different from DXing stations in the HF and VHF frequencies. There is a definite difference between day and night reception, but the reasons are not as well understood. According to Jacques d'Avignon, "When you listen to Iceland on 189 kHz, you hear nothing in the daytime, but as soon as the path is in total darkness the signal can reach armchair level. This will go on all night as long as the full path is in darkness. As soon as the sun rises in Iceland you lose the signal."

Below 100 kHz, signals travel almost entirely by groundwave, but most NDBs are found between 190-530 kHz and seem to be conducive to some degree of skip propagation. Check out Jacques d'Avignon's "Propagation Conditions" column from August through September for further discussion of how LF signals travel.

In spite of their low power, unusual conditions do occur permitting reception of far away, low-power beacons – especially at night. In a recent two-day period here in Ohio, I logged MH stations from the Bahamas, Texas, Louisiana, Maine, Nova Scotia, and an LOM from Maine!

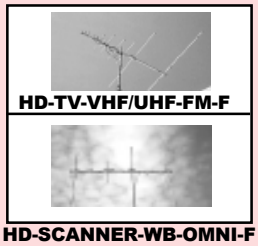
LF reception can also suffer severely from static – natural or manmade. Lightning storms hundreds of miles away can override all but local beacons. Arc lamps (fluorescent, mercury, sodium vapor) and sparking motor commutators (sweepers, mixers) can be a problem. The best LF DXing usually occurs during cold clear winter days, but good conditions can happen at any time.

If you haven't tried beacon DXing, power up your receiver, tune it to the 190 to 530 kHz band and give it a try. You might get "hooked." It is exciting and challenging hobby and it is difficult to describe the thrill of receiving a LOM several hundred miles away. You will just have to experience it.

About the author: Ralph Craig spent 30 yrs with the Federal Aviation Aministration as a supervisory electronic technician and field office chief. He's been a ham radio operator for more than 50 years.

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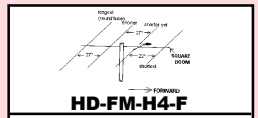

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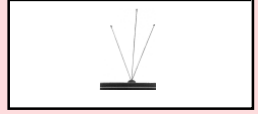
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A Quadraform LF Receiving Loop Antenna

By Richard Q. Marris G2BZQ

Quadraform = fourfold: having four forms or aspects

This quadraform low frequency receiving loop covers from 120 kHz to 220 kHz (2500 to 1364 meters). It thus covers the recently introduced European 136 kHz Amateur Band, plus the U.S. 1750 meter (160 to 190 kHz) Low Frequency Experimental Band, which is also used in Australia and New Zealand and elsewhere in the Pacific area.

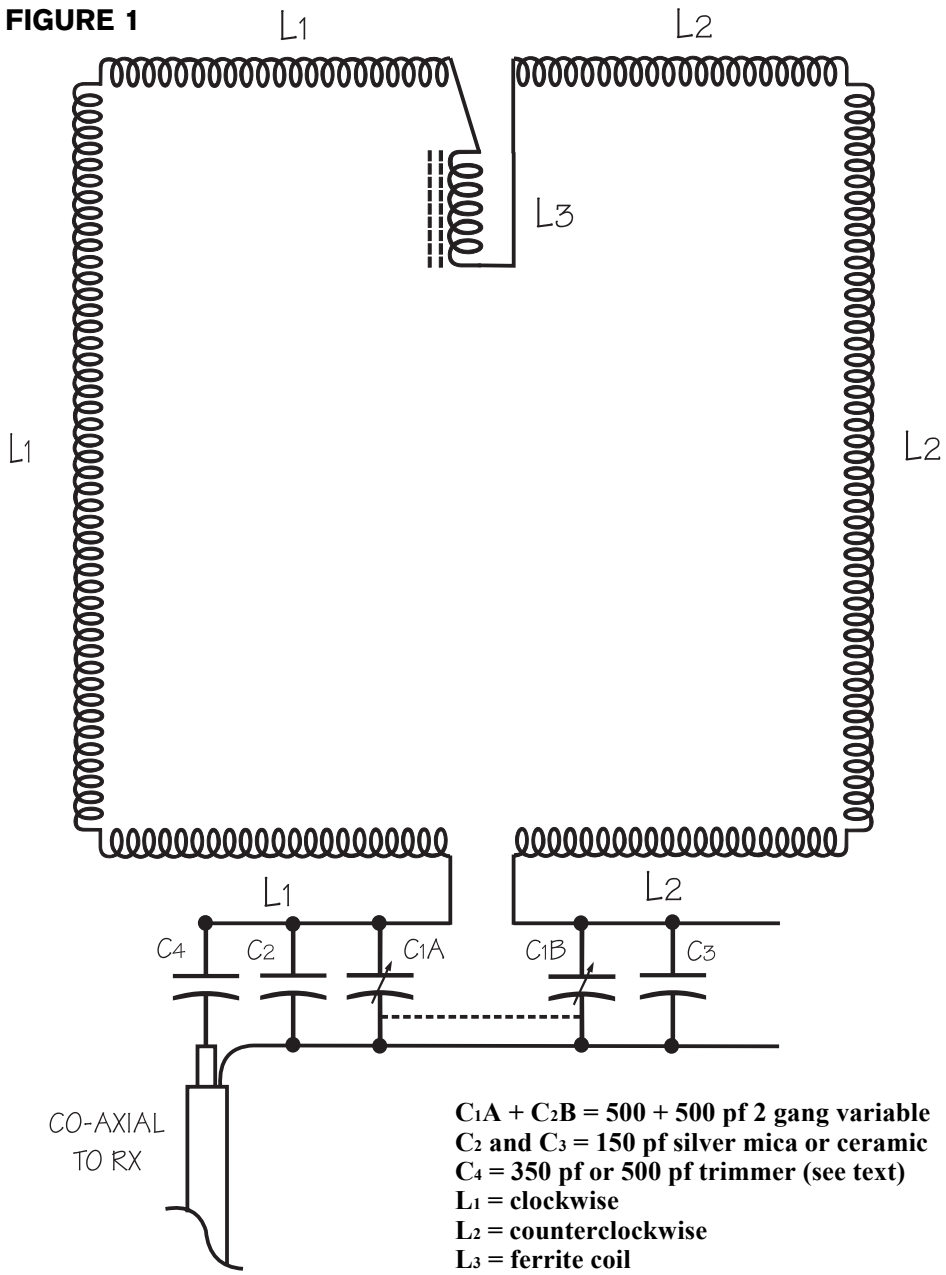
This is a specialist loop, covering just 100 kHz of the LF spectrum. The design and construction are of unusual conception, to produce a maximum sensitivity (i.e. RF voltage to receiver input), with efficient nulling to eliminate or greatly reduce the man-made and atmospheric interference noise level met with at these frequencies.

The European 136 kHz amateur band (135.7 kHz to 137.8 kHz) is rapidly spreading throughout the countries of Europe, and there is every indication that other countries will gradually adopt it, including, hopefully, the United States.

So, the Quadraform Loop offers the European listener the 136 kHz band, some of the long wave broadcast stations, various civil and military beacons and navigational systems, and a chance to listen for the US 1750 meter experimental band. In Europe the latter is usually shrouded by several of the multikilowatt European AM broadcast stations.

For the North American listener there is the 1750 meter band, some European AM broadcast stations and possibly the European 136 kHz amateur band, plus being

FIGURE 1



$C_1A + C_2B$ = 500 + 500 pf 2 gang variable
C_2 and C_3 = 150 pf silver mica or ceramic
C_4 = 350 pf or 500 pf trimmer (see text)
L_1 = clockwise
L_2 = counterclockwise
L_3 = ferrite coil

ready for if/when this band is adopted in the US.

In the Southern Hemisphere, Australia, New Zealand, and various other countries can use the Loop for their 1750 meter band and hearing a variety of navigational services; and sooner or later they will no doubt also get the 136 kHz amateur band.

It is interesting to note that on occasion over many years, reports have been noted that the BBC Broitwich 200 kHz (now 198 kHz) station has been received in Australia and New Zealand. The writer used to receive Droitwich from time to time while living and working in the US through the 1970s.

So you can see that the 120 – 220 kHz segment is full of interest and occasionally yields unexpected radio traffic. It is a much different ballgame from the reasonably predictable and well-documented HF amateur activity. No doubt it will gradually increase over the next few years.

General background on Loops

The most commonly used loop antenna is probably used for medium wave broadcast band reception.

A typical medium wave receiving loop could consist of a 40" x 40" timber frame, onto which is wound 6 turns of wire resonated by a 500 pf variable capacitor. A separate one would be used for low impedance coupling to the receiver. The main loop winding therefore consists of about 80 feet of wire (24 meters). The loop frame dimensions can be reduced or increased, as long as about 80 feet of wire is still used.

A similar loop for the European Long Wave Band would need about 3-1/2 times as much wire; or 80 x 3-1/2 = 280 feet (approx: 84 meters), and could be expected to pick up a substantially higher signal level than the MW version. The LF end of the long wave loop would be 150 kHz (2000 meters).

The loop to be described covers from 120 kHz to 220 kHz (2500 meters to 1364 meters). It uses 2 x 100 meter rolls of wire, of which about 1-3/4 are used; or approximately 583 feet or 175 meters of wire. That is over twice that used in a conventional LW band loop – to which must be added a large ferrite rod coil!

Schematic design

Figure 1 shows the schematic of the 120 – 220 kHz loop. The loop consists of L1 = L2 closewound onto a 36" high x 30" wide tubular plastic frame. It is tuned or resonated by 2-gang variable capacitor C1A + C1B in a balanced circuit.

L1 is helically *closewound counterclockwise* on the left-hand side of the loop with L2 being *clockwise* helically wound on the right-hand side. (See construction).

At the top, a large ferrite rod coil L3 is inserted vertically and connected between L1 and L2. L3 decreases the current in the top limb of the loop, producing a high voltage point. This substantially increases the current in the loop's vertical sides, thus increasing the loop sensitivity and directivity (nulling).

L1 + L2 + L3 are tuned by C1A + C1B (2-gang x 500 pf) with C2 + C3 (150 pf each) in parallel; thus enabling a conveniently available size of variable capacitor to be used.

The coaxial feedline to the receiver is coupled via C4 (350 pf). For extreme DX reception C4 can be an adjustable compression trimmer (500 pf).

The reception pattern of the loop is a figure eight, with one lobe being larger than the other to a ratio of approximately 3:2. The overall result is sharp nulling to reduce or eliminate manmade and other interference. The 3:2 lobes assist greatly in reduction of reciprocal bearing interference.

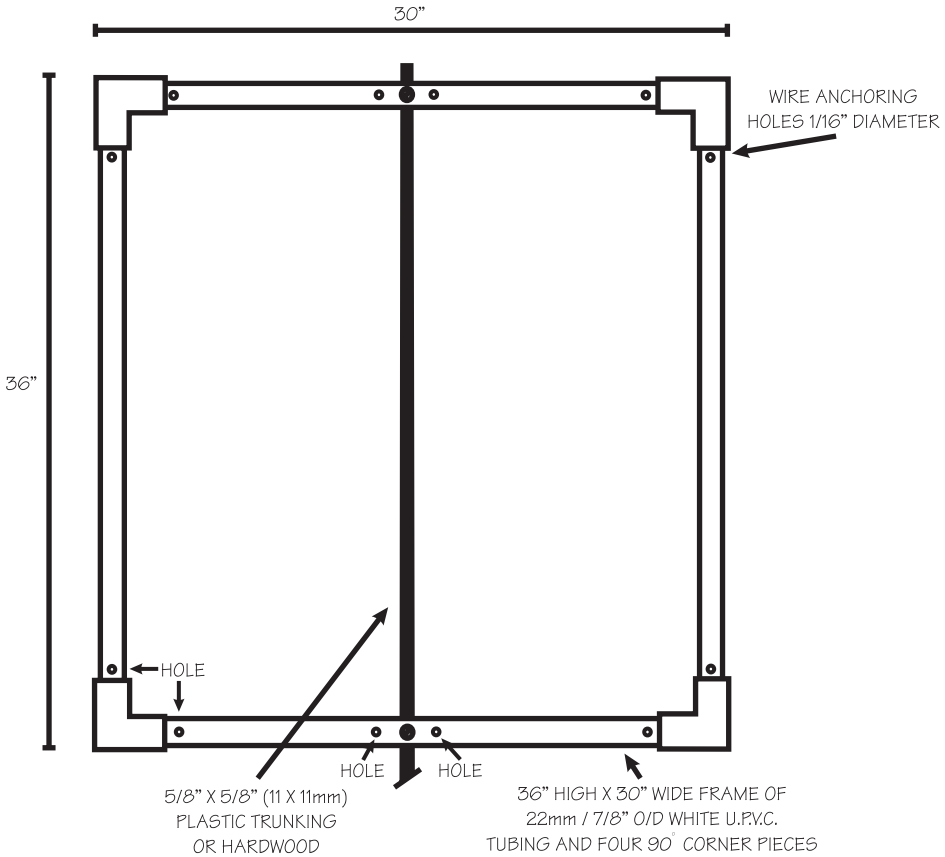
Construction

Loop Frame – Figure 2

The frame is constructed of 7/8" (22mm) outside diameter white UPVC tubing, as available in larger do-it-yourself stores. Two 6 foot (or maybe 2 meter) lengths will be required; plus 4 x 90 elbows, and two wall clips (used later for mounting to base).

The sides are cut from the lengths of tubing and fitted at each corner with a 90 degree elbow, to produce a frame exactly 36" high x 30" wide (see Figure 2). Small holes are drilled through the tubing at each corner, right against the shoulders of the elbows. These holes are for anchoring the winding wire turns.

FIGURE 2



A vertical center strut is bolted onto the frame as shown. It is made from a length of 5/8" x 5/8" (11mm x 11mm) white plastic electric trunking or hardwood. It is secured with a nut and bolt at top and bottom. Two wire securing holes are drilled through the tubing up against the strut, as shown.

Loop Winding L1 and L2 - Figure 4

For the winding, two 100 meter rolls of 7/0.2mm PVC covered wire (1.2mm o/d). A contrasting color (e.g. black) to the white tubing should be used to facilitate ease of winding.

The vertical center strut should be removed.

L1 is wound *counterclockwise* commencing at the top left hand center wire hole. The winding must be *closewound* along the left-hand side of the top, right up to the shoulder of the left hand top elbow, and taken through the wire hole at that point (see Figure 4).

Then proceed down the left-hand vertical side, *counterclockwise*, still *close-winding* until the bottom left hand elbow is reached, and then taken through the provided hole. Then continue, still winding *counterclockwise* along the bottom left-hand section of the loop frame. Terminate at the provided hole, leaving a tail (see Figure 4).

For L2, repeat the above on the right hand half of the loop frame and winding clockwise (as Figure 4). Then fit on the vertical strut again.

Winding L3 - Figure 3

L3 is wound on an Amidon nickel-zinc 61 material 7-1/2" long x 1/2" diameter ferrite rod (see parts list). Two layers of large self-adhesive address labels are first wound around the rod. Onto this is a 160mm wide closewound winding of 24 SWG enamel copper wire. Terminate with PVC hook-up wire leads.

Tape L3 to the vertical loop strut, as Figure 4, and solder the L3 leads to the inner top ends of L1 and L2.

FIGURE 3 - 24 SWG enamel copper wire closewound clockwise over 2 layers self-adhesive label

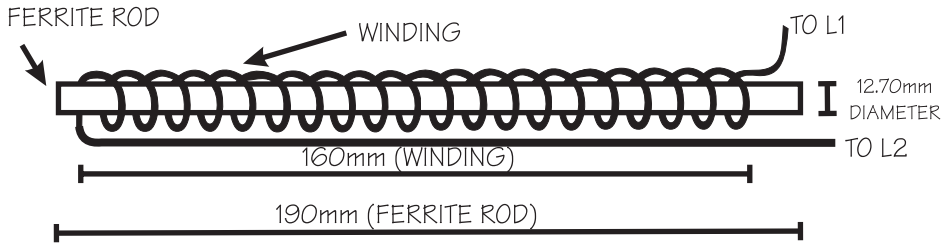
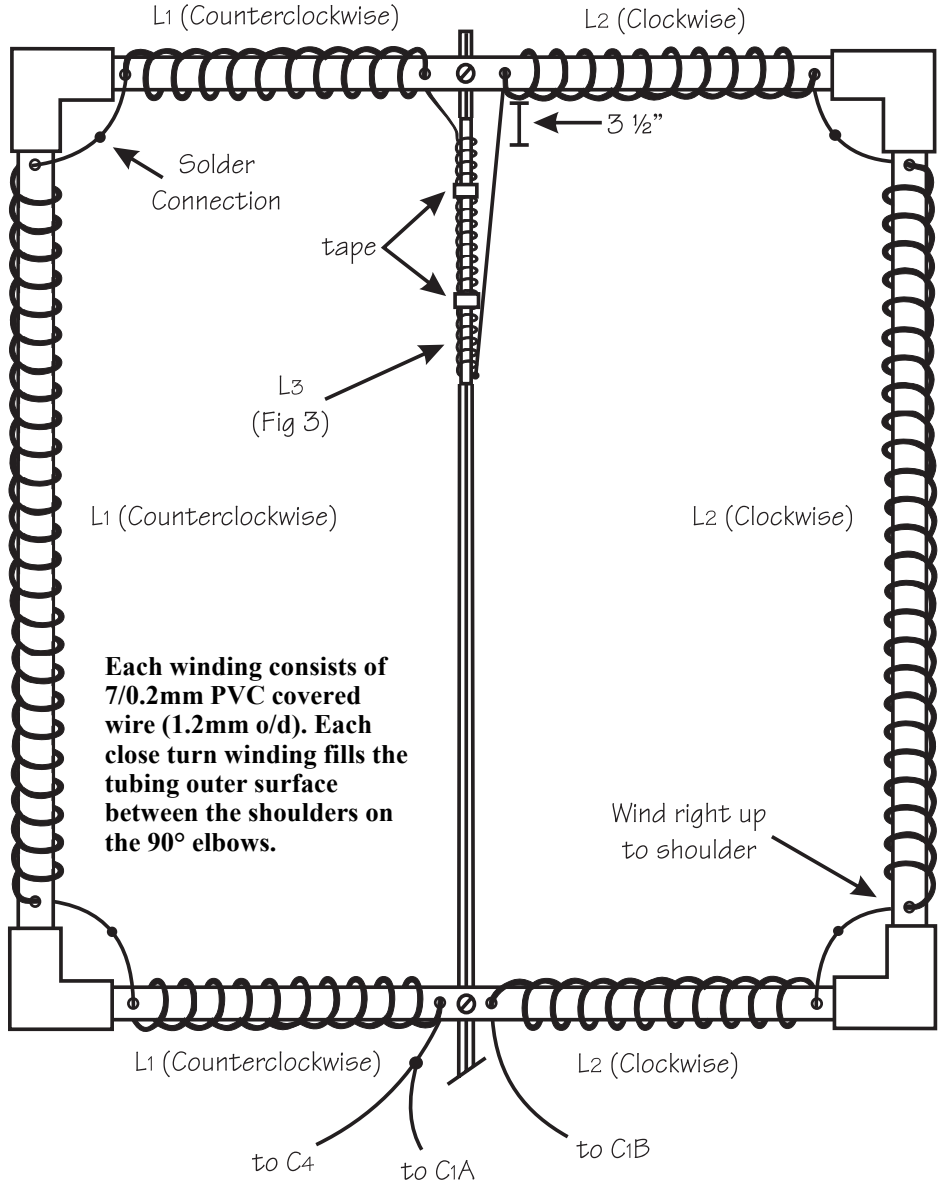


FIGURE 4



Loop support structure

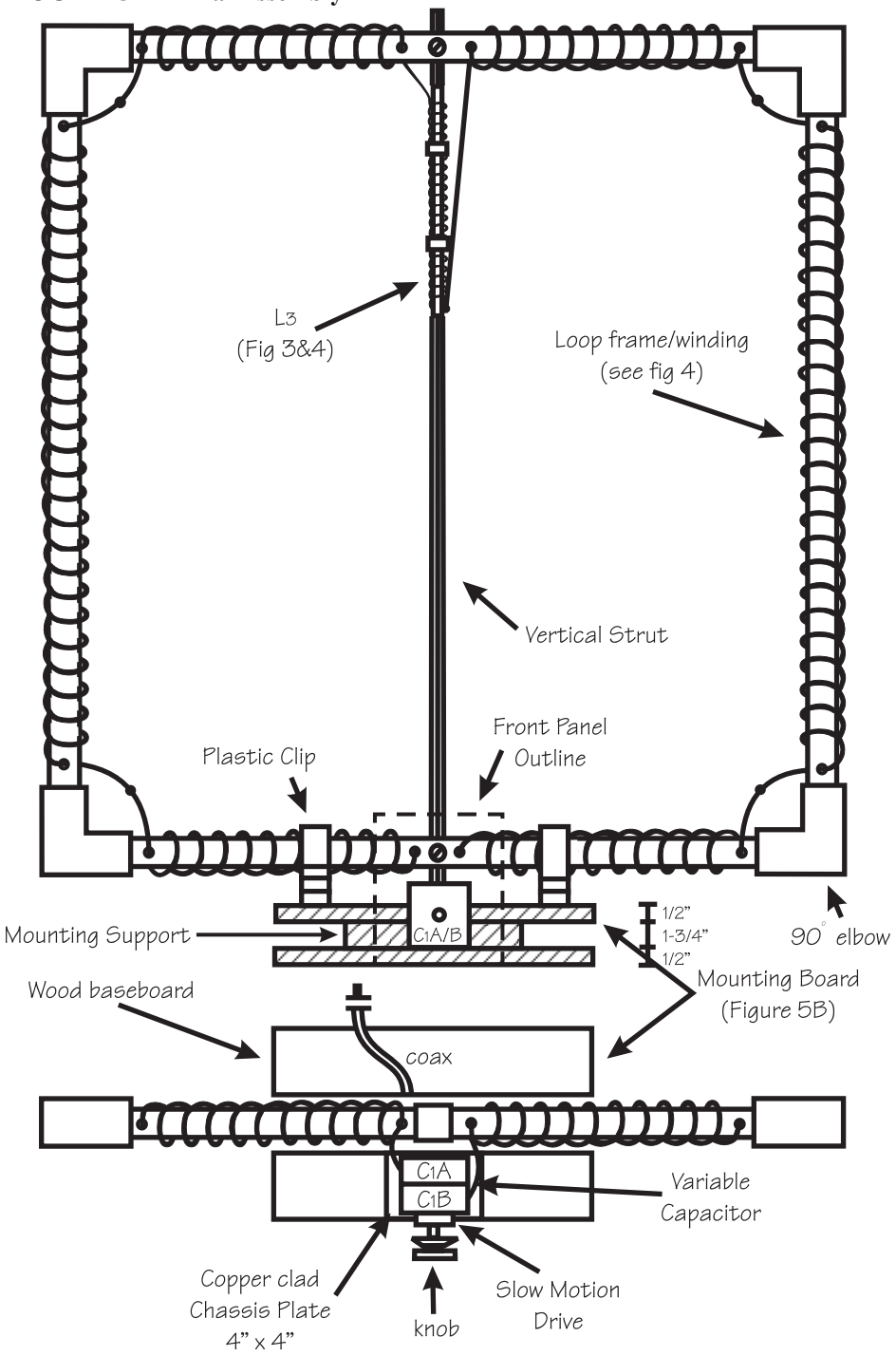
This is made of good dry timber as Figure 5B. A single side piece of copper clad board 4" x 4" x 1/16" provides a chassis plate, as shown, held in place with small woodscrews. An identical size front panel is on the front center (Figure 5A and 5B), and seam soldered to the chassis plate.

C1A and C1B variable capacitor is mounted on the panel/chassis plates and fitted with an optional slow motion drive, dial and knob (Figure 5A).The variable capacitor should be a rigid air-spaced type.

Final Assembly

The finished loop is mounted on the loop support structure (Figure 5B), using the

FIGURE 5A - Final Assembly



two plastic piping wall clips screwed to the mounting board (see Figure 5B). The bottom of the vertical strut should be pre-cut to fit, and wood screwed to the back of the support board.

C2 and C3 are soldered across C1A and C1B, being 150 pf ceramic or silver mica types. C4 is taken from C1A or C1B (see later) to the coaxial feedline, with the feedline outer braid being soldered to the chassis plate. The feedline is cleated to the baseboard (Figure 5A) and should be as short as convienient.

Testing and Operating

The loop will normally stand on a flat surface alongside the operating position on either the right or left side. The more ambitious may remotely control it.

For the initial test, locate a signal about midband around 150 kHz. Rotate the variable capacitor for maximum signal, and rotate the loop to check the directivity. It should be found that at 90 degrees the signal should be zero, except, possibly, in the case of the most powerful local stations, which will be greatly reduced, as will manmade noise.

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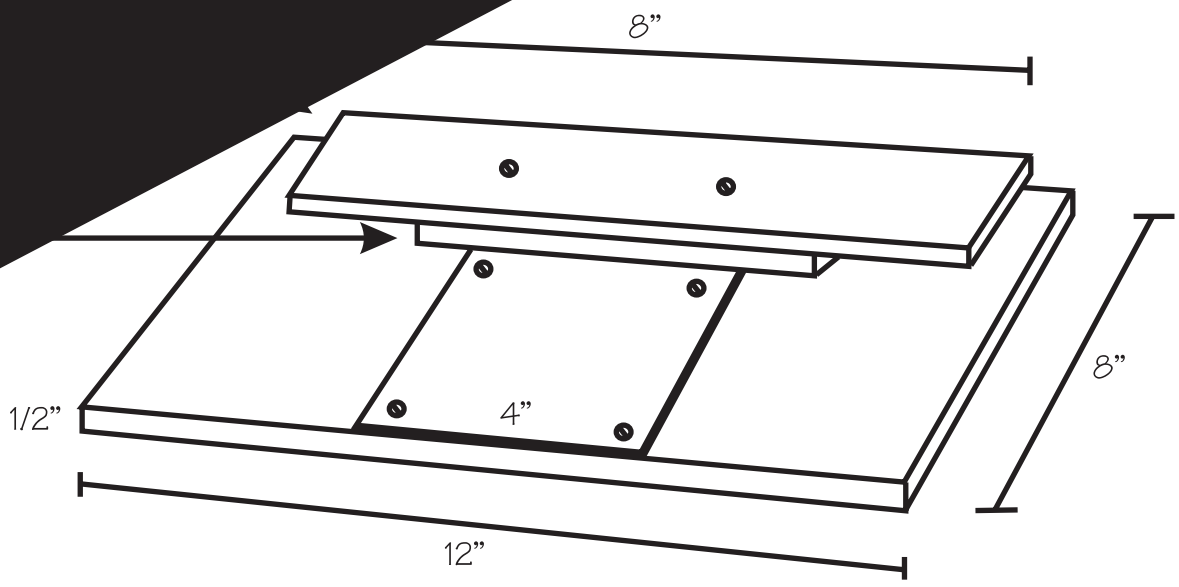
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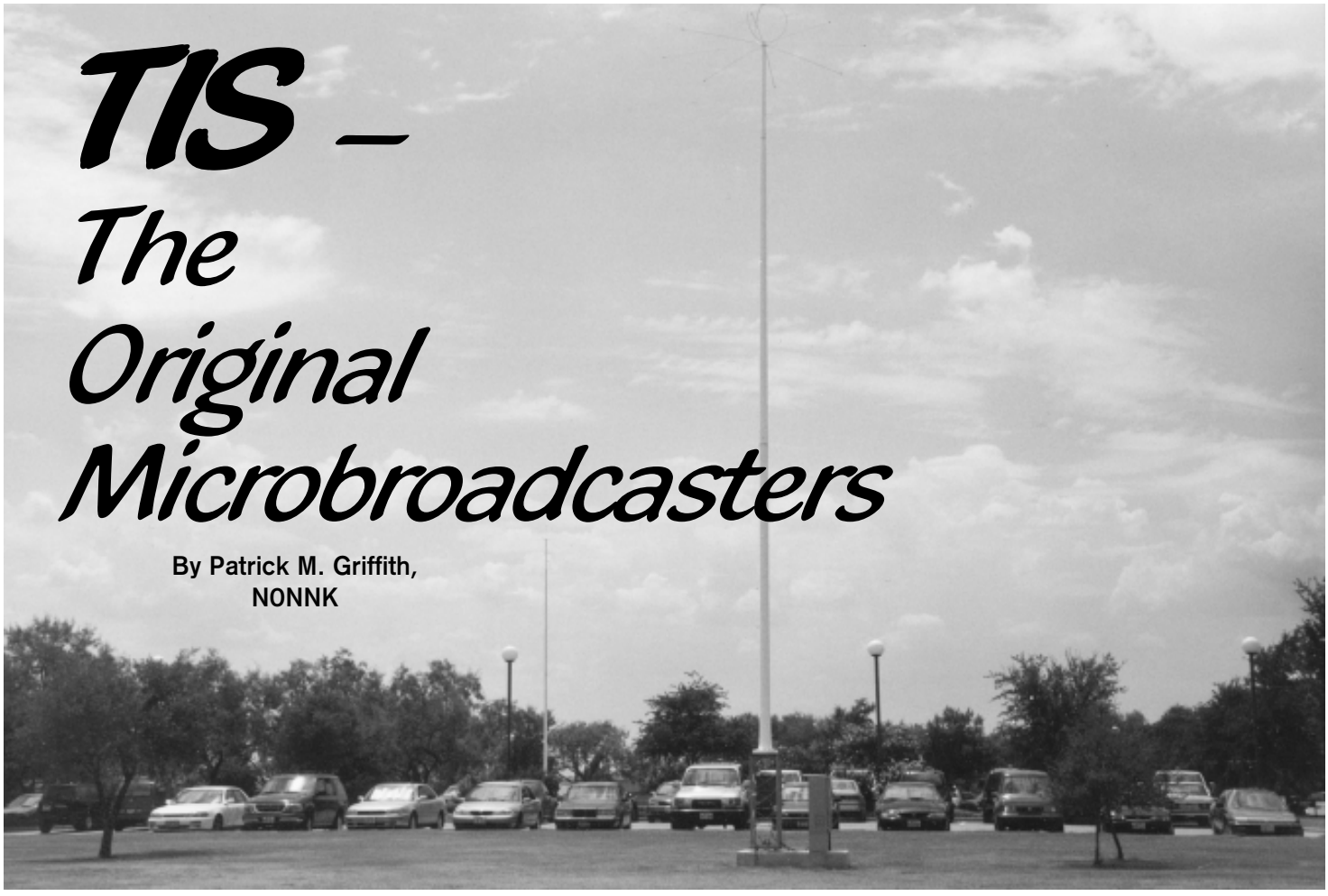
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TIS — The Original Microbroadcasters

By Patrick M. Griffith,
NONNK



The dual antennas for the widely heard TIS stations at the Dallas/Ft Worth Airport are located next to the Airport Administration Building just west of runway 35R. The antenna closest to the camera in this south-facing view is the 1640 kHz station, which carries departure information.

Established by the Federal Communications Commission (FCC) in 1977, Traveler's Information Stations (TIS), also known as Highway Advisory Radio stations, continue to be installed in ever increasing numbers throughout the United States. Current FCC records show over 730 TIS licenses with stations in nearly every state.

The purpose of these stations is to provide information to travelers, via standard AM radios, that might not be readily or easily available to them by other means. TIS stations operate under sections 90.20(a) and 90.242 of the Code of Federal Regulations. They may only be licensed to government entities and park districts. They are prohibited from transmitting music or commercial programming with the exception that announcements concerning air, train, and bus terminals may include the trade name of the carriers in order to facilitate information concerning arrivals, departures, and parking. Although there are some exceptions, TIS stations are generally limited to 10 watts or less of transmitter power and an antenna height of 15 meters (49.2 feet) or less.

TIS stations were originally confined to operations on either 530 or 1610 kHz, just below and just above the AM broadcast band as it existed in the 1970s. These two frequencies continue to be the most used TIS channels with over 250 transmitters currently licensed on each of them. However, with the steadily increasing number of these stations, two frequencies proved to be insufficient for the operation of this service. Today, with the implementation of the AM expanded band frequencies, these stations can now be found on many of the 118 channels located between 530 and 1700 kHz operating right alongside their big brothers, the commercial AM stations.

Unlike their AM broadcast counterparts who are licensed by the FCC's Audio Services Division, TIS licenses are administered by the Land Mobile Branch of the FCC's Wireless Telecommunications Bureau. Their TIS Web site located at **http://www.fcc.gov/mmb/asd/bickel/tis/freqtis.html** contains a listing of licensed TIS stations. This site is also full of technical information about these stations including transmitter power, transmitter site coordinates, antenna height, mailing addresses, and frequently even the name of the licensee's responsible representative. This information can be extremely useful to listeners who wish to obtain verification of reception (QSLs) from TIS stations.

Verifying Your Reception

While many of these stations will respond to QSL requests, it is rare for TIS stations to actually produce QSL cards. In most cases your best bet is to send the station a prepared postpaid reply card (PPC). This can be anything from a post card sized cardboard cutout to a highly detailed card produced on your computer. You fill the PPC out with your return address and a return postage stamp along with the basic information about the reception such as date, time, and frequency. Appropriate spaces may be left so that the verifier can simply fill in the blanks for items such as transmitter power and antenna type.

The PPC is then mailed in an envelope along with a letter from you explaining your hobby and politely asking the recipient to take time from their other duties in order to

comply with your request. The recipient can then sign it and drop it in the mail for return to you.

Always remember that if a station verifies your report, they are only doing so as a favor to you. They are not required to honor your request. Whenever possible, I like to make my PPCs on the back of a scenic post card that has something to do with the station or the city it is located in. This makes a nice collector's item.

Interesting Variations

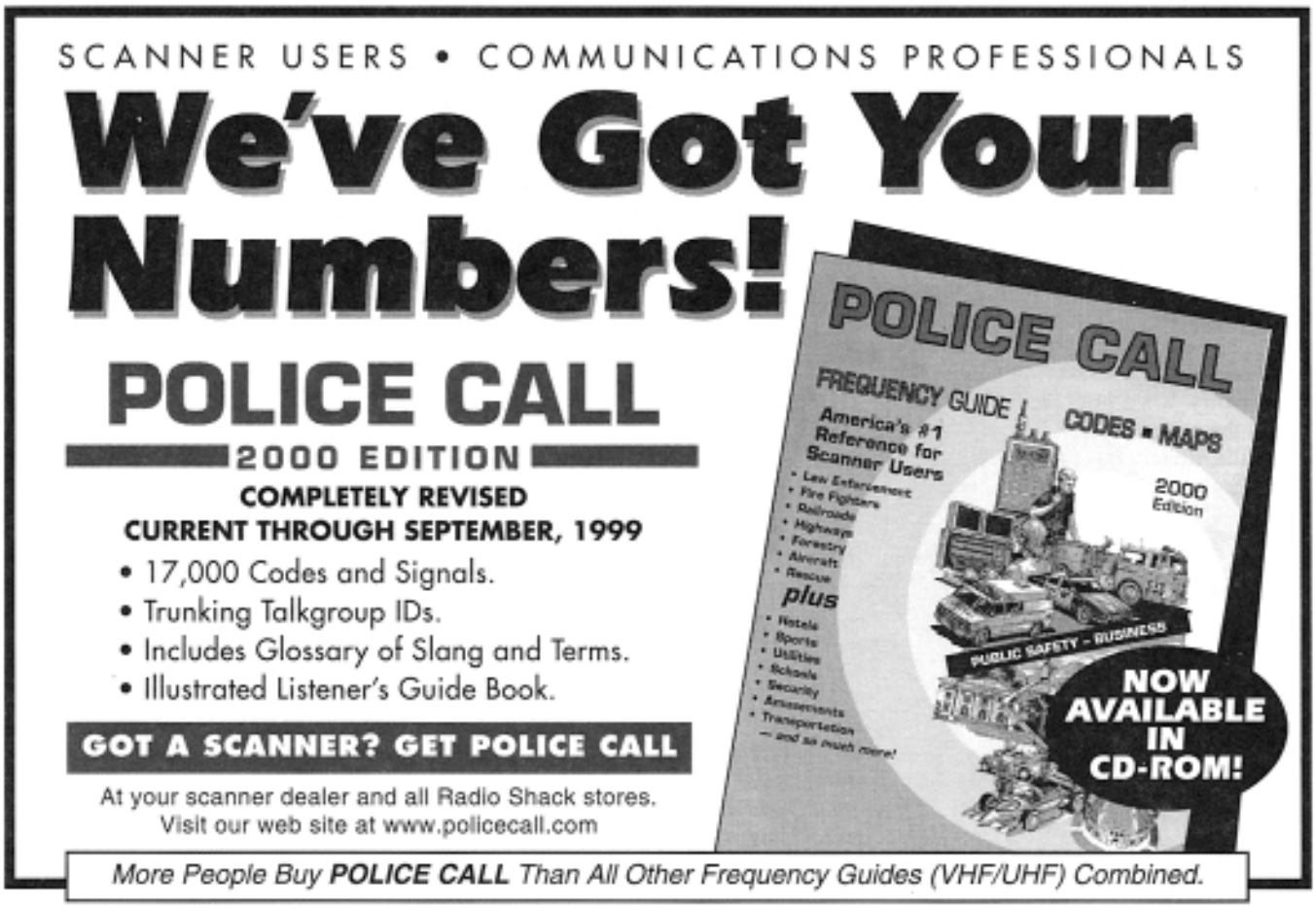
While the majority of TIS stations are limited to a transmitter power of 10 watts or less, in several cases superpower stations have been licensed. These stations have been allowed higher than normal power because of the very large area they must cover. One of the more well known examples of this are the two stations that went on the air in early 1997 at Dallas/Fort Worth (DFW) International Airport.

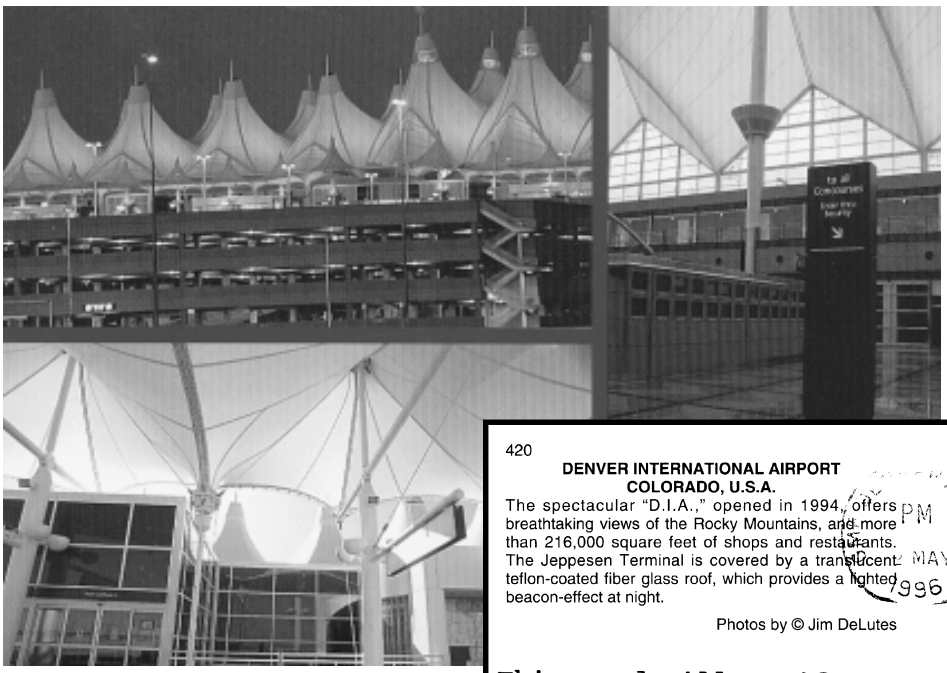
Operating on 1640 and 1680 kHz under the call sign WPLR660 (formerly WQO767), the DFW stations transmit with 60 watts and have been heard virtually worldwide. They provide arrival and departure gate information. While available for use by all airlines operating at DFW, to date only American Airlines, whose corporate home is at DFW, and its subsidiaries have made use of these stations. The DFW stations were designed to provide coverage over an area of about 30 square miles.



Closeup view of the base of the 1680 kHz arrival information TIS station at DFW Airport. The box contains the actual transmitter plus the antenna tuning unit.

Not all TIS stations use an antenna to broadcast their signals. Some use special radiating coax cable in place of an antenna. Unlike regular coax cable that is designed to keep the signal inside, this cable is specially





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Photos by © Jim DeLutes

USA 32

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designed to leak a small amount of the signal throughout its length. The cable can be looped around a parking lot, throughout a building, through a tunnel, or along a road or trail. The signal can be received a short distance from the cable. These stations are allowed to transmit with up to 50 watts of power since they have much shorter range than their antenna-equipped counterparts.

Some government agencies prefer to present their TIS stations to the public as if they were a commercial style station. The Lakewood, California, TIS station on 1620 kHz is an example of this. The city has even nicknamed their station with an unofficial call sign that sounds like a radio station, KLWD. Its actual call sign is WPGG527. Lakewood also operates a Web site that can be found at **http://www.lakewoodcity.org/magazine/story_klwd.html** with information about the station.

Naperville, Illinois, has a unique TIS system. It uses three TIS transmitters, spaced around the city, that simulcast the signal in order to increase coverage range. The three stations are synchronized by GPS satellite. View the press release about this station at **http://www.naperville.il.us/pr050197-2.htm** for more information.



This sign near Dallas/Fort Worth International Airport notifies drivers to tune to 1640 or 1680 for American Airlines and American Eagle departure and arrival information (courtesy DFW Intl Airport Dept of Public Affairs)

More TIS Resources

Another good source of information about TIS stations is the National Travelers Information Radio Exchange (NTIRE). This is an association for TIS station operators, but membership is open to anyone who is interested. They publish a quarterly newsletter called the *NTIRE News*. Contact them through their Web site at **http://www.issinfosite.com/entire.html** for details.

Probably the best TIS station Web resource that I have found is "Bill's Ultimate TIS Digest." Operated by TIS enthusiast Bill Harms, this site is a wealth of information and even includes links to manufacturers of TIS equipment. It is located at **http://www.erols.com/wharms/tis/** and will provide you with hours of information and entertainment.

As the popularity of TIS stations has increased, some actual commercial stations have apparently begun to emulate them. KKTR, a widely heard California station operating on 1650 kHz, is a full power commercial station that provides continuous traffic reports for the Los Angeles basin much like a giant TIS station. And the Florida Department of Transportation is working on an agreement with a commercial network called the Traveler In-

formation Radio Network. Their chain of 18 commercial AM stations will provide the nation's first statewide travel advisory radio system. See **http://www.dot.state.fl.us/moreDOT/spenews/fltirn.htm** for more information about this network.

As more government entities find out about the capabilities of TIS radio stations, their popularity continues to increase. TIS stations are being used for traffic alerts, road construction information, disaster evacuation instructions, news about public meetings and events, parking information, and much more. Expect to see many more TIS stations coming on the air in your area.

About the Author: *The author is a licensed amateur radio operator and has been a broadcast band DXer since 1964. He has written over a dozen magazine articles and has supplied hundreds of photos to various magazines, mostly about radio and communications related subjects. He is the author of a recently published book entitled AM Broadcast Station Antenna Systems – A Basic Guide. He can be contacted by E-mail at AM-DXer@webtv.net.*

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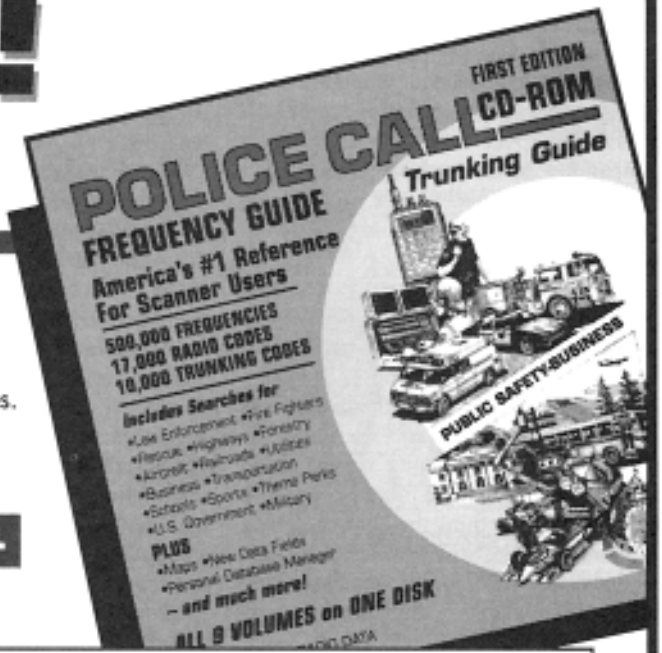
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MONITORING STRATEGIES FOR Y2K

By Haskell Moore, W5HLM

Much has been written about the impending turn of the century and the effect the date change may have on computer systems worldwide. Those two little digits representing the century within the date fields were left off many systems years ago in order to save disk space, and have now come back to haunt us in a big way.

Unfortunately, this is an unprecedented event, and separating fact from hype has never been more difficult. No one can predict for certain how sustained or severe the impact to society may be. However, never has the Boy Scout motto of "Be Prepared" been more appropriate. And for those of us in the scanning, CB and ham radio community, being prepared means having our radios ready for action.

A discussion of the potential effects of the Y2k was undertaken last month, with many source references for you to do your own research. This month's approach is essentially a guide to scanning during a disaster, while addressing the unique aspects of the Y2k situation as I perceive them.

If there are Y2k-related problems, as a scanning enthusiast you can have a significant advantage over most other individuals who must depend on the delayed and often-inaccurate news media. That is, if you have made the proper preparations long before the turn of the century.

Before making any purchases, it would be a good idea to assess how long you plan to be able to run your monitoring station in "disaster mode." Unlike a hurricane or a winter storm, where the duration of the outage can be anticipated based on past experience, no one can be certain how long we might be without electricity (or if we'll even lose power at all). Whether you think this thing will be a "non-event," will last two weeks, or are preparing to hunker down for the next two years, it's imperative that you decide a plan of action for you and your family. Then, based on whatever scenario you wish to believe, you can make your radio and power decisions accordingly.

Emergency Radios

The logical place to start is with the radios themselves. If you are reading this article, there's a pretty good chance you already have one or more scanners at your disposal. However, now is a good time to take stock of your equipment and consider what you may need in order to keep up with what's happening on the airwaves around you.

First, I recommend at least two scanners as a bare minimum. If it's important enough to have one radio, it's important enough to have a backup. Murphy's Law never takes a holiday, and in the middle of a crisis is a bad time to have your only scanner decide to die! Also, if things really do get interesting, it's almost a foregone conclusion that you'll need to break up your monitoring activities among at least two radios. For example, you may wish to dedicate one radio to a limited number of frequencies that may have an impact on your immediate safety (local police, fire, etc.), and use the second radio to scan a larger area to get a general idea of the big picture in your vicinity.

If you are serious about scanning, a high quality scanner can be a very wise investment. Personally, one of my favorite radios is the AOR 8000 (recently superseded by the 8200) which will allow me to monitor almost every conceivable public service frequency, as well as local television and radio (AM or FM) audio. And with the right antenna, its short wave capabilities will allow me to keep up with unfolding events around the world. These radios don't come cheap, but quality seldom does. In my mind, having at least one high-quality, wideband, portable scanner, and an ample supply of batteries for it, is essential.

If the agencies that you intend to monitor make use of trunked systems, then one of the Uniden TrunkTracker scanners should also be considered. Since they can also receive conventional, nontrunked communications, they are an excellent emergency scanner. The Uniden BC245XLT, which can monitor both conventional and trunked systems simultaneously, may be a wise investment.

To further complement your emergency communications capabilities, you should consider various types of radios that you may not normally utilize. For example, there are a large number of CBs in most communities, some in personal vehicles, some in homes, and many stored away in the garage. These are excellent short-range, inexpensive radios that can be quickly pressed into action in an emergency. You can operate one from your home with a magnetic mount antenna stuck on a metal garbage can lid or even a pizza pan. And though you may not be a CB enthusiast, in an emergency, you never know where a good source of information may turn up.

Among the radios I often use for monitoring are commercial radios such as a Motorola, as well as various Standard trunked and conventional models. The advantage of these radios are that they are typically very rugged, reliable, and are less affected by intermod than most scanners.

However, they do have some important drawbacks that you should consider. First, very few commercial radios will work on over-the-counter batteries, such as AAs. Most have dedicated battery packs that will last only a few hours between charges. So if the power is unavailable, these radios may be useless very quickly unless you have an alternate method of charging them.

Also, most commercial radios are limited to one band, whereas a high quality wideband scanner will allow you to monitor several bands with one radio. And finally, since many commercial radios require a computer to program them, they are very inflexible in terms of being quickly modified if you new need to monitor frequencies other than those you've already programmed into the radio.

Though I have several commercial radios at my disposal, I usually plan my monitoring strategy around conventional scanners that can be programmed quickly and easily through the keypad as my monitoring needs change.

Emergency Power

Of course, the best radios money can buy are of no use if you can't power them. And if there is power disruption, then you need to have given a lot of thought to how you intend to operate your equipment.

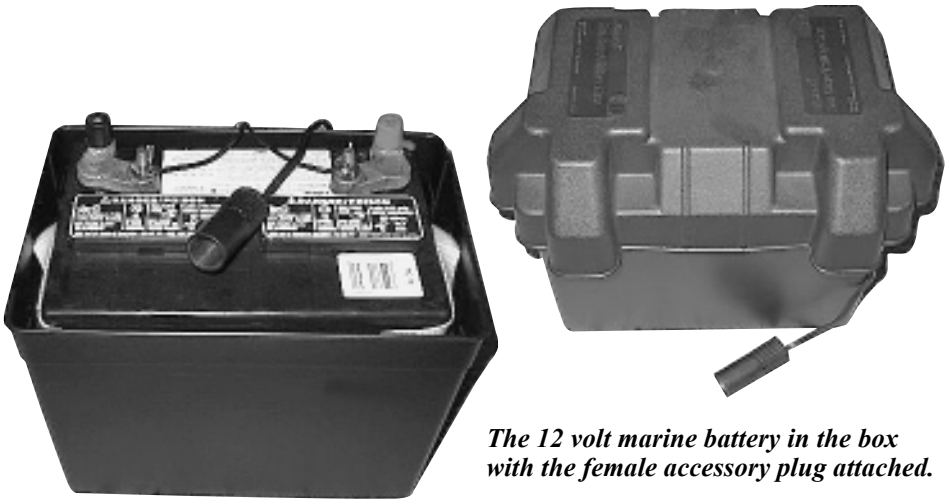
For portable radios with internal batteries, this is not a difficult decision. You need only to stock up on the proper size batteries for your radios. However, there are a couple of things you should consider.

First, rechargeable batteries are usually a poor choice for emergency use. Typically, most rechargeable batteries have a very high self-discharge rate (that is, they actually discharge themselves when not in use). They may actually lose a substantial percentage of their capacity every day. And of course, there's the issue of how to recharge the batteries if the power is out. Even if you have a generator, you wouldn't want to burn five gallons of gasoline to charge a set of batteries.

For emergency use, alkaline batteries may be your best bet. I find the best deal is to buy them in bulk at the local discount store. Most of them have excellent shelf life. I would recommend only buying those with an expiration date clearly marked on the package or battery. Having a battery tester, preferably one which measures the voltage under load, is also an essential item (I use the Radio Shack model 22-090).

If you are planning to use your scanner for an extended time during emergencies, it would be wise to load it up with a fresh set of batteries, tune in the local NOAA weather station, set the volume to a comfortable level, then time how long the batteries last. Based on this test, you can get an idea of the number of batteries you would need for however long you expect to use the radio. And again, it's important that you have the volume turned up the a normal level for this test, since much of the current drain on a scanner is dependent on the audio level (which also implies that to get the longest listening time from your batteries, use an earphone whenever possible).

For those of us who plan to power larger radios, such as mobile scanners and ham or CB equipment, then 12 volt batteries are the way to go. There are many advantages to going the "12 volt route." For instance, your local recreational vehicle supplier has a full range of lights and accessories that operate on 12 volts. Radio Shack even makes a 12 volt soldering iron – an essential item for those inevitable repairs if the lights go out.



The 12 volt marine battery in the box with the female accessory plug attached.

It's important to note that your average car battery is not well suited for this task, since they are intended to deliver high current for a short duration. Also, repeated deep discharges of an automobile battery will soon diminish its capacity or destroy it. Marine deep cycle batteries, typically used for trolling motors and RV accessories, are designed for low current drain over a long duration. These batteries are a much better choice for powering electronics for hours on end, and are designed for repeated charge/discharge cycles.

For my personal home monitoring station, I chose only radios that could be powered by 12 volts DC as opposed to 120 volts AC. I then built a small junction box in a plastic enclosure with a male lighter plug and several DC plugs. This allows me to power all radios from one female lighter socket on the 12 volt battery. By having two of these batteries, I can use one battery to power the radios while the generator is charging the other.

There are a number of ratings on deep-cycle batteries (CCA, MCA, etc.), most of which are useless for the purpose of determining their capacity for our intended application. The one rating you need to look for is "amp hours." This is the approximate number of amps that a battery can deliver over a period of time before reaching its discharge voltage. Theoretically, a 100 amp-hour battery could deliver 100 amps of current for one hour, or one amp of current for 100 hours.

In actual practice, a very low current drain will yield substantially more energy out of a battery than if were discharged at a higher rate. In other words, when using a 100 amp-hour battery, a 2.5 amp load may take 50 hours to discharge the battery, giving an effective yield of 125 amp-hours. However, discharging the same 100 amp-hour battery at 100 amps may only give you 30 minutes of power before discharging, resulting in an effective yield of only 50 amp-hours. So for our purpose of powering only a handful of radios and accessories that draw relatively little current, you should be able to obtain even more power from your lead-acid battery than the amp-hour rating for the battery.

To determine how long you can power your radios from a lead-acid battery, you need to know the amp-hour rating of the battery, and the total current drawn by the radios. For example, if I run all of my radios simultaneously, they draw a total of 2.5 amps, and my marine battery is rated at 80 amp-





Battery with a Statpower TRUEcharge, microprocessor-controlled, 10 amp continuous duty, multi-stage battery charger attached

hours. By dividing 2.5 into 80, it is easy to determine that I can run all radios continuously for approximately 32 hours.

For those using Citizen's Band or ham rigs, you need to check the current drain of those radios when "keyed up," since they draw considerably more current when transmitting than just receiving. Be sure to take this into account when calculating the expected life of your battery.

To determine the current drawn by each of your radios, you will need an ammeter, or a multimeter capable of measuring amperage. Then, you should measure each radio's current drain, and label each radio accordingly. You will find that most 12 volt scanners will draw between one-quarter to one-half of an amp (250 to 500 milliamps) with the audio at normal level.

With this information in hand, if it becomes necessary to ration battery power, you will be better prepared to determine how long you can run your radios from a specific battery. Just add up the total current for all radios being used and perform your calculations based on the formula in the previous paragraph.

It should be noted that the term "deep cycle" is a bit misleading – it does not equate to "deep discharge." In actual practice, you should never discharge your 12 volt battery (which is probably closer to 13.8 volts when fully charged) below approximately 10.5 volts. To do so may permanently damage the battery and shorten its life. Also, leaving a battery hooked up to a charger that continuously delivers a constant charge may cause the battery to overheat and be damaged. You should either monitor the battery during charging with a graduated-float hydrometer (available at most automotive, hardware or sporting good stores), or use a charger that has built-in circuitry to cut off the charge when the battery has reached capacity.

The other advantage of 12 volt batteries is that they can be recharged from your car by simply hooking them up in parallel with your existing car battery and starting the car's engine. The length of time to fully charge the battery will vary greatly, depending on your battery's capacity and the type of electrical system in your car. Of course, using your car as a battery charger implies that you have plenty of gas to run the engine for an extended duration.

When choosing lead-acid batteries for emergency backup, keep in mind that bigger is not always better. The bigger the battery, the longer it will take to charge it. Two smaller batteries may be better than one large one. Then, you can charge one with a generator (or your automobile) while the other is in running the radios.

There are a few special safety guidelines to consider when working with lead-acid storage batteries. First, if the battery is tipped to one side or falls over, the acid may leak out. This acid is typically strong enough to cause severe burns to skin, blindness if splashed in the eye, and damage to whatever it may contact. I've found that keeping the batteries in a battery box designed for use on a boat makes it a lot safe and easier to store and transport them. These can be found at most hardware or sporting goods stores, alongside the marine batteries, and cost less than ten dollars.



A combination volt and ammeter power 12 volt power distribution box.

Additionally, when charging lead-acid batteries, they reach a point, usually at about 90% of their full charge, where they begin "gassing", that is, giving off hydrogen gas. In sufficient quantity, this gas presents a significant fire or explosion hazard. Be sure to provide adequate ventilation when recharging lead-acid batteries.

For those situations where nothing but a little 120 volts AC will do, you may wish to add an inverter to your list of required equipment. These devices convert low voltage DC (typically 12 volts) to 120 volts AC.

Inverters come in a wide range of wattage ratings, with various accessories and output quality. However, for emergency use, I've found that a 250 watt model offers about the right compromise between power and price. A unit of this size can perform a wide variety of functions such as heat up a soldering iron, charge and run a laptop computer, or power a small TV. If you do decide to use rechargeable batteries or commercial rechargeable radios in your monitoring arsenal, you can even use the inverter to power the charger.



Standard two-way radio charger plugged into a Statpower 250 watt inverter

Emergency Antennas

In addition to adequate power, you should also consider which antennas are most effective for your monitoring needs. If you live in an area where the signals are strong and reception is reliable, then just the stock antennas on the radio may be sufficient. However, remember that in an emergency, especially one that involves loss of power, much of the communications may be done in simplex, that is direct from one unit to the other, without the use of powerful repeaters. If this occurs, then having at least one good external antenna is advisable.

For those who us who live in fringe reception areas, our antenna needs are a bit more complicated. When deciding on placement, remember that higher is almost always better. This, of course, can reach a point of diminishing returns if the run of coax required results in excessive signal loss. Also, the strength of the signal getting to your scanner will be greatly dependent on the quality of the antenna, coax and connections utilized.

For monitoring-only applications – that is, where you will not be transmitting on the antenna – I prefer a high-quality 75 ohm cable TV coax. The impedance mismatch between the 75 ohm coax and the 52 ohm antenna and radio circuit is usually so insignificant as to present no major signal loss. Also, this coax is especially well suited for the 800 MHz range, where most trunked communications systems are found.

Radio Shack has a wide range of antenna adapters available for converting one type of connector to another. These come in very handy when converting the "F" connectors found on cable TV coax to "BNC" connectors used by most scanners.

For typical monitoring purposes, I usually have at least one "all purpose" antenna available. The Radio Shack or Diamond discone will work well across most of the spectrum, though discone antennas offer no significant gain. For the best "bang for the buck," the Radio Shack 20-176 VHF-Hi/UHF antenna at $19.95 is hard to beat. Several other, more expensive, high quality antennas such as the Nil-Jon (see their ad in *MT*) or the Scantenna from Antennacraft (sold by Grove) may also serve this purpose well. For 800 MHz trunked radio systems, you may also choose to simply use cellular phone antennas (which typically have about 3 dB of gain) mounted near the radio.

For more specialized monitoring needs, you should consider commercial antennas designed for a specific band. Larsen, Maxrad, and Diamond all make quality antennas with varying degrees of gain for specific bands that can be useful in picking up weak or distant signals.

If you live in a community that has deed limitations or other limitations on the types of antennas you can have outdoors, then consider mounting them in your attic. As long as you don't have a metal roof, there should be no significant signal loss due to mounting them indoors. I currently have about ten antennas in my attic, covering everything from shortwave to UHF. Of course, in a real emergency, the deed restriction committee is going to have other things on their mind, so you could probably get away with putting up all the antennas you want on a temporary outdoor mast until the emergency is over.

And speaking of multiple antennas, sorting out all of that coax can be a real problem, especially under stressful conditions. Radio Shack's Universal Cable and Wire Markers (#278-1648) are very handy for identifying the various coax feed lines coming into your monitoring station.

Emergency Light

Another important concern in a power outage is lighting. It will do you little good to have an impressive bank of scanners and frequencies, and no way to see what you're doing. A conventional flashlight may not be the best choice for extended use in an emergency situation.

I've found that the Black & Decker SnakeLight works well, and casts a broad beam over a short distance. Their unique "snake" design also allows them to be hung up or placed in a variety of locations to cast light over a small work area. For those who have 12 volt batteries available, there is an automotive version (model SLR1) which runs off of a 12 volt automotive adapter.

Another option is the use of fluorescent camping lanterns. There are even several models that can run off of either internal batteries or 12 volt power supplies. The advantage of fluorescent lighting is that it not only lights up the radios, but the entire area as well. Typically, fluorescent lights have a relatively high light output for a modest current requirement. And again, taking Murphy's Law into account, be sure to have extra bulbs for whatever lighting method you choose.

Other Emergency Stuff

For those who choose to utilize a generator for extended outages, either to power equipment or charge batteries, there are numerous issues to be dealt with. For those with access to the Web, there are several excellent links and link pages listed at the end of this article. They cover everything from guides to help you choose the right generator to safe methods of storing fuel.

Briefly stated, you need to decide if you are going to depend on your generator to power several large devices in your home, or if you only intend on using the generator as a power supply to charge your 12 volt storage batteries. The main difference is the cost; around $300-$700 for a small, 1000 watt model compared to $2,000 or more for a quality 5,000 watt unit. The amount of fuel,

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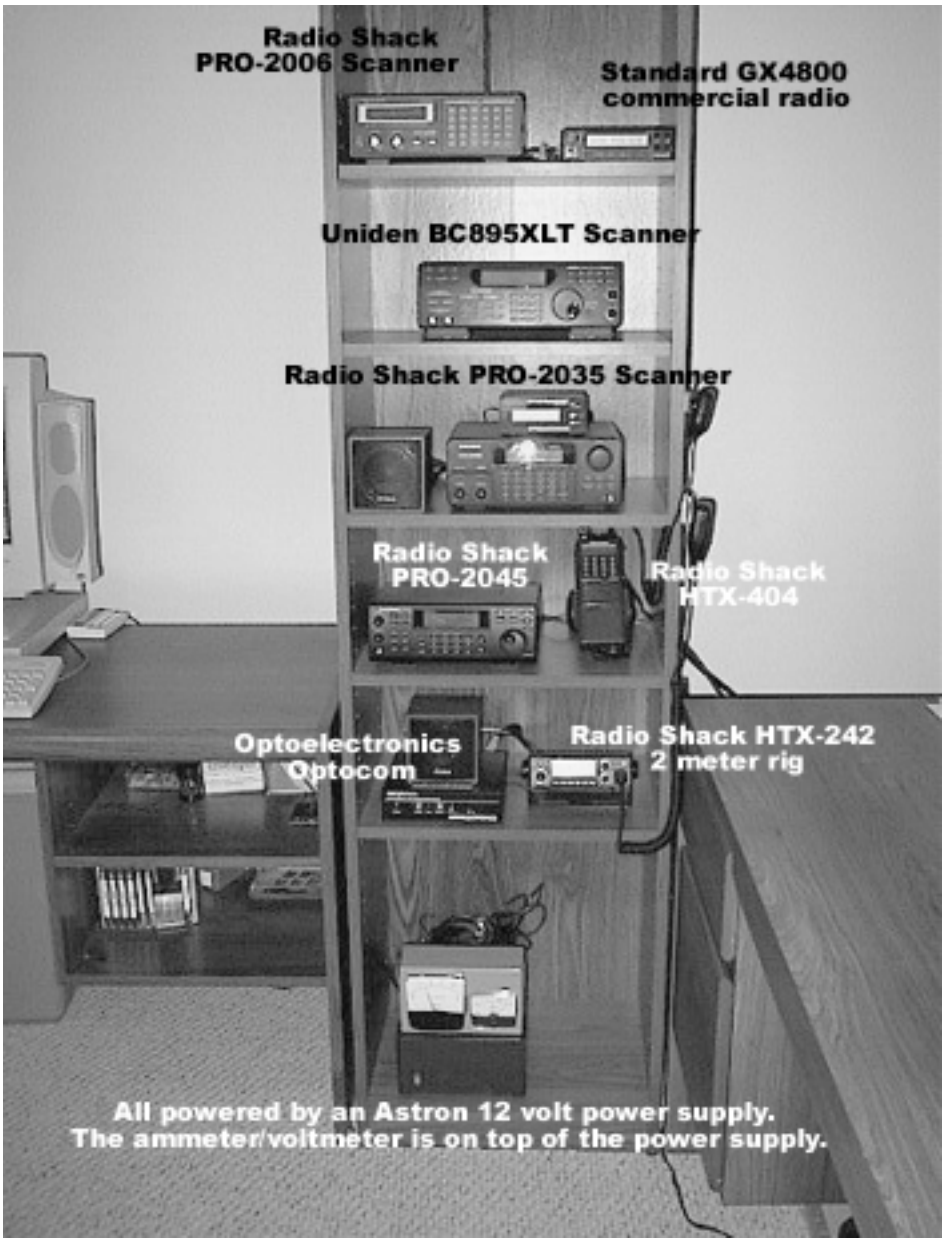
along with the attendant problems of fuel storage and containers, will vary greatly between the two extremes. And though a full discourse on generators is beyond the scope of this article, I will throw in one important tip: be sure to use some type of fuel additive in your gasoline to keep it from deteriorating (see STA-BIL link and FAQ's below).

Finally, be sure to have a current list of frequencies you intend to monitor on a printed list! If things do get bad at the turn of the century, don't count on having either power to run your computer, or phone service to connect to the Internet. A simple, straightforward spreadsheet or handwritten list may be the best source of information during an emergency. *Monitoring Times* will be providing some essential frequencies in next month's article on Y2k monitoring, but only you know the best local frequencies to monitor in your area. If not, you have about two months to become familiar with them!

As the year 2000 approaches, I truly hope that all of my time and preparations have been in vain. The best case scenario is that Y2k will be nothing more than a few minor inconveniences, if that much. But, we owe it to ourselves and our families to be prepared as best we can – for this and for other unforeseen emergencies. Let's just hope for the best and prepare for the worst. One thing's for certain: it should make for an interesting few days of monitoring!

Note: The author does not work for any of the companies mentioned, nor endorse any of the products of any in the article or listed on these Web pages. Radio Shack products are frequently referenced by the author because of their ready availability in most parts of the country.

Haskell Moore, W5HLM, has been involved in amateur radio for approximately seven years, and has been a scanning enthusiast for more than twenty. You can visit his web site at http://idt.net/~kb5wix/



My emergency monitoring station.

HELPFUL WEB PAGES RELATED TO Y2K ISSUES:

Power Links

Exide's Frequently Asked Questions for more information on marine batteries.
http://www.exideworld.com/boatfaq.htm

Twelve volt battery chargers and inverters, as well as useful technical information: http://www.statpower.com/home.htm

Many useful links to other web pages regarding various power-related issues:
http://www.ccsp.sfu.ca/epix/topics/power/power.html

Generator sales and information, as well as good information and FAQs:
http://www.mayberrys.com/honda/generator/html/maingenerator.htm

Jade Mountain Renewable Energy Products
http://www.jade-mtn.com/energy.html

Master Generators specifications and price list
http://www.mastergenerators.com/

Honda Generators specifications, pricing and many useful links
http://www.mayberrys.com/honda/generator/html/maingenerator.htm

Emergen Generator Transfer Switch
http://www.connecticut-electric.com/switch.html

Sta-bil Fuel Treatment
http://www.sta-bil.com/

Antenna Links

Diamond Antennas
http://www.rfparts.com/diamond/

Larsen Antennas
http://www.larsenet.com/

Maxrad Antennas
http://www.maxrad.com/

NIL-JON Antennas
http://www.nil-jonant.com/

Rich Well's Strong Signals Page featuring base and handheld antenna reviews
http://www.strongsignals.net/

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The Bearcat 895XLT is superb for intercepting trunked communications transmissions with features like TurboScan™ to search VHF channels at 100 steps per second. This base and mobile scanner is also ideal for intelligence professionals because it has a Signal Strength Meter, RS232C Port to allow computer-control of your scanner via optional hardware and 30 trunking channel indicator annunciators to show you real-time trunking activity for an entire trunking system. Other features include ***Auto Store*** – Automatically stores all active frequencies within the specified bank(s). ***Auto Recording*** – Lets you record channel activity from the scanner onto a tape recorder. ***CTCSS Tone Board*** (Continuous Tone Control Squelch System) allows the squelch to be broken during scanning only when a correct CTCSS tone is received. For maximum scanning enjoyment, order the following optional accessories: **PS001** Cigarette lighter power cord for temporary operation from your vehicle's cigarette lighter $14.95; **PS002** DC power cord - enables permanent operation from your vehicle's fuse box $14.95; **MB001** Mobile mounting bracket $14.95; **EX711** External speaker with mounting bracket & 10 feet of cable with plug attached $19.95. The BC895XLT comes with AC adapter, telescopic antenna, owner's manual and one year limited Uniden warranty. Not compatible with AGEIS, ASTRO, EDACS, ESAS or LTR systems.

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10 Priority Channels • Programmed Service Search
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Frequency Coverage:
29.000-54.000 MHz., 108-174 MHz., 406-512 MHz., 806-823.995 MHz., 849.0125–868.995 MHz., 894.0125-956.000 MHz.

Our new Bearcat TrunkTracker BC245XLT, is the world's first scanner designed to track Motorola Type I, Type II, Hybrid, SMARTNET, PRIVACY PLUS and EDACS® analog trunking systems on any band. Now, follow UHF High Band, UHF 800/900 MHz trunked public safety and public service systems just as if conventional two-way communications were used. Our scanner offers many new benefits such as **Multi-Track** – Track more than one trunking system at a time and scan conventional and trunked systems at the same time. **300 Channels** – Program one frequency into each channel. **12 Bands, 10 Banks** – Includes 12 bands, with Aircraft and 800 MHz. 10 banks with 30 channels each are useful for storing similar frequencies to maintain faster scanning cycles or for storing all the frequencies of a trunked system. **Smart Scanner** – Automatically program your BC245XLT with all the frequencies and trunking talk groups for your local area by accessing the Bearcat national database with your PC. If you do not have a PC simply use an external modem. **Turbo Search** – Increases the search speed to 300 steps per second when monitoring frequency bands with 5 KHz. steps. **10 Priority Channels** – You can assign one priority channel in each bank. Assigning a priority channel allows you to keep track of activity on your most important channels while monitoring other channels for transmissions. **Preprogrammed Service (SVC) Search** – Allows you to toggle through preprogrammed police, fire/emergency, railroad, aircraft, marine, and weather frequencies. **Unique Data Skip** – Allows your scanner to skip unwanted data transmissions and reduces unwanted birdies. **Memory Backup** – If the battery completely discharges or if power is disconnected, the frequencies programmed in your scanner are retained in memory. **Manual Channel Access** – Go directly to any channel. **LCD Back Light** – An LCD light remains on for 15 seconds when the back light key is pressed. **Autolight** – Automatically turns the backlight on when your scanner stops on a transmission. **Battery Save** – In manual mode, the BC245XLT automatically reduces its power requirements to extend the battery's charge. **Attenuator** – Reduces the signal strength to help prevent signal overload. The BC245XLT also works as a conventional scanner. Now it's easy to continuously monitor many radio conversations even though the message is switching frequencies. The BC245XLT comes with AC adapter, one rechargeable long life ni-cad battery pack, belt clip, flexible rubber antenna, earphone, RS232C cable, Trunk Tracker frequency guide, owner's manual and one year limited Uniden warranty. Not compatible with AGEIS, ASTRO, ESAS or LTR systems. Hear more action on your radio scanner today. Order on-line at http://www.usascan.com for quick delivery.



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Bearcat 895XLT-A1 300 ch.TrunkTracker base scanner	$194.95
Bearcat 278CLT-A 100 ch base AM/FM/SAME WX alert	$169.95
Bearcat 248CLT-A 50 ch.base AM/FM/weather alert scanner	$99.95
Bearcat 245XLT-A 300 channel TrunkTracker II scanner	$269.95
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Bearcat 60XLT1-A 30 channel handheld scanner	$79.95
Bearcat BCT12-A2 Stormtracker info mobile scanner	$144.95
Bearcat BCT7-A information mobile scanner	$149.95
ICOM ICR8500-A1 wideband communications receiver	$1,499.95
ICOM PCR1000-A1 computer communications scanner	$399.95
ICOM R10-A1 handheld wideband communications rec.	$339.95

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Frequency Coverage:
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The AOR AR8200B is the ideal handheld radio scanner for communications professionals. It features all mode receive: WFM, NFM, SFM (Super Narrow FM), WAM, AM, NAM (wide, standard, narrow AM), USB, LSB & CW. Super narrow FM plus Wide and Narrow AM in addition to the standard modes. The AR8200 also has a versatile multi-function band scope with save trace facility, twin frequency readout with bar signal meter, battery save feature with battery low legend, separate controls for volume and squelch, arrow four way side rocker with separate main tuning dial, configurable keypad beep/illumination and LCD contrast, write protect and keypad lock, programmable scan and search including LINK, FREE, DELAY, AUDIO, LEVEL, MODE, computer socket fitted for control, clone and record, Flash-ROM no battery required memory, true carrier re-insertion in SSB modes, RF preselection of mid VHF bands. Detachable MW bar aerial. Tuning steps are programmable in multiples of 50 Hz in all modes, 8.33 KHz airband step correctly supported, Step-adjust, frequency offset, AFC, Noise limited & attenuator. Wide and Narrow AM in addition to the standard modes. For maximum scanning pleasure, you can add one of the following optional slot cards to this scanner: **CT8200** CTCSS squelch & search decoder $89.95; **EM8200** External 4,000 channel backup memory, 160 search banks. $69.95; **RU8200** about 20 seconds chip based recording and playback $69.95; **TE8200** 256 step tone eliminator $59.95. In addition, two leads are available for use with the option socket. **CC8200** PC control lead with CD Rom programming software $109.95; **CR8200** tape recording lead $59.95. The AR8200B comes with 4 AA ni-cad batteries, charger, cigar lead, whip aerial, MW bar antenna, belt hook, strap and one year limited AOR warranty.

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Richard Barnett
ScanMaster@aol.com

Big Changes in the Big Apple

The New York City Police Department (NYPD) has completely revamped its communications system over the last six months. New frequency assignments, new tone codes (PL/CTCSS), and new 480 and 460 MHz tactical frequencies are all now in use.

New York, along with Los Angeles, Washington, DC, and Chicago are perhaps the ultimate places to scan in the nation (write me if you've got one better!). There's incredible, non-stop action that's almost entirely in the clear. The Special Operations Division (SOD) channels are fantastic to monitor as they provide instant notification of the most important incidents in the city (a number of hobbyists walk around New York with pagers tuned solely to the primary SOD channel).

Here, courtesy of Warren Silverman, editor of the *Scanner Master New York Metro/Northern New Jersey Guide*, is an update on the latest changes to the NYPD radio system.

Frequency	Zone	Precincts	CTCSS (Rx)
Patrol Boro Manhattan South			
476.5625R	1	1-5-7	100.0
476.4375R	2	6-9	110.9
476.3375R	3	10-13	123.0
476.5875R	4	MTS-17-MTN	136.5
471.0875R		PBMS	100.0
Patrol Boro Manhattan North			
476.3875R	5	19-23	151.4
476.3125R	6	20-CP-24	167.9
476.6375R	7	25-28-32	186.2
476.3625R	8	26-30	100.0
476.8875R	9	33-34	110.9
471.0625R		PBMN	110.9
482.7125		MANIO	123.0
Patrol Boro Bronx			
476.5375R	10	40-41	123.0
476.8375R	11	42-44	136.5
476.9125R	12	43-45	151.4
476.4875R	13	46-48	167.9
476.9625R	14	47-49	186.2
476.6625R	15	50-52	100.0
482.7375		BXIO	136.5
471.0375		PBBx	123.0
Patrol Boro Brooklyn South			
476.4625R	16	60-61	110.9
476.5125R	17	62-68	123.0
476.9375R	18	63-69	136.5
476.8625R	19	66-70	151.4
477.0125R	20	67-71	167.9
476.4125R	21	72-76-78	186.2
470.9875		PBBS	136.5
Strategic and Tactical Command Brooklyn North			
476.9875R	22	73-75	100.0
476.7375R	23	77-79	110.9
476.7875R	24	81-83	123.0
476.7625R	25	84-88	136.5
476.6875R	26	90-94	151.4
470.9625		PBBN	151.4
482.7875R		Brooklyn IO	151.4
Patrol Boro Queens South			
477.1375R	27	100-101	156.7
477.0875R	28	102-106	186.2
477.0375R	29	103-107	100.0
477.1125R	30	105-113	110.9
470.9375		PBQS	167.9
Patrol Boro Queens North			
476.7125R	31	104-112	123.0
476.6125R	32	108-114	136.5
477.0625R	33W	109	151.4
482.6125R	33E	111	151.4
476.8125R	34	110-115	167.9
482.8125R		QNS IO	167.9
470.9125		PBQN	186.2
Patrol Boro Staten Island			
482.8875R	35N	120	186.2
482.5875R	35S	122-123	186.2
482.8375		SIION	186.2
482.5375		SIIOS	186.2
482.8625		PBSIN	100.0
482.5625		PBSIS	100.0

Citywide Frequencies (a sampling)

Frequency	CTCSS	Use
470.8375R	136.5	SOD
482.7125R	123.0	Manhattan Interoperability
482.7375R	136.5	Bronx Interoperability
482.7875R	151.4	Brooklyn Interoperability
482.8125R	167.9	Queens Interoperability
482.8375R	186.2	Staten Island N. Interoperability
482.5375R	186.2	Staten Island S. Interoperability
471.0875R	100.0	Patrol Boro Manhattan South
471.0625R	110.9	Patrol Boro Manhattan North
471.0375R	123.0	Patrol Boro Bronx
470.9875R	1365	Patrol Boro Brooklyn South
470.9625R	151.4	Patrol Boro Brooklyn North
470.9375R	167.9	Patrol Boro Queens South
470.9125R	186.2	Patrol Boro Queens North
482.8625R	100.0	Patrol Boro SI North
482.5625R	100.0	Patrol Boro SI South

Tactical Frequencies (a sampling)

485.6125	203.5	TAC A	Patrol Zones 1,6,11,16,21,26,31
485.5875	210.7	TAC B	Patrol Zones 2,7,12,17,22,27,32
485.5625	218.1	TAC C	Patrol Zones 3,8,13,18,23,28,39
485.4875	225.7	TAC D	Patrol Zones 4,9,14,19,24,29,35
485.4625	233.6	TAC E	Patrol Zones 5,10,15,20,25,30
485.4375	203.5	TAC F	Task Force
473.6875	210.7	TAC G	SOD & TCD
473.7125	218.1	TAC H	SOD & TCD
485.4125	225.7	TAC I	SP. CMD
465.1125	203.5	TAC J	

and other 460 MHz frequencies.

Scanner Marketing 101 – Another Follow-up

In response to the recent article on how to attract more interest in our scanner hobby, Tony McNamara wrote us with his recent experiences in becoming acquainted with radio along with his idea on how to attract interest in scanning:

"I bought *Passport to World Band* for $20 eight months before diving in. I live near Seattle, and hoped that it would tell me more than I could learn from the Internet about what equipment is needed to listen to shortwave and whether I would actually then be able to receive anything.

"All I could learn, through both sources, was that...

a) radios start cheap but people prefer very very expensive ones
b) nobody can actually explain what difference to reception the features make
c) Seattle is a "bad reception" area, but that may or may not mean you can pick anything up.

"So here I am, not being able to find out anything from the stores or magazines, knowing I live in a poor reception area but not knowing how big an impact that will have, and not particularly wanting to become the stereotype. And yet extremely curious about shortwave. And the price of 'decent' entry is about $200! Not real cheap to most people.

"What got me over the hump was the Sangean 404 came out with all the features I really figured I needed for starting, and Grove sold it for about $60. So I bought one. Now I understand shortwave.

"A bit later, a (non-stereotypical) shortwave fanatic came out to my place with a Kenwood table radio, a Sangean 909, and a R.S. DX-390, and we compared features/receptions. Now I can help the newbie in Seattle, if I ever run into one.

"Which brings us full-circle. The question was: How can we get people interested in Scanning? The problem with Shortwave was that I had some interest but little knowledge, and I couldn't get more knowledge. There's a way.

"Make scanning (and/or shortwave) an integral part of volunteer efforts. If all you do when scanning is sit in a dark room at home, you won't win many converts. But if you volunteer at the local fair to run the lost-child section, and have both the fair-issued walkie-talkie AND your portable scanner (ostensibly to listen for any reports of missing kids), people will notice and be intrigued. Man a booth at the fair ABOUT scanning. Start a local scanning club. Help your kid do a science project for his/her school that uses scanning, or discusses wave propagation and illustrates with a scanner.

"These are ideas we use with gun clubs and with car clubs. I don't know that the radio community is as much a community as those are, but if not, make it one.

"That's my input, from a newbie who STILL doesn't understand the appeal of scanning. <grin>"

Three Cheers for Cincinnati

Mark Meece reported recently that for the fourth straight time the voters of Hamilton County, Ohio, have defeated a proposed tax levy for Cincinnati/Hamilton County to purchase a Motorola Digital Trunk System. County Commissioners are going to look into how they can upgrade the current system. Mark says, "So once again we bite the bullet and will be able to continue to easily monitor local communications in the 460 MHz band."

Trunking Update

SmartScanner is now up and running for frequency downloads to the Bearcat 245 TrunkTracker II. We'll have a complete report and description on how this service works next month. Meanwhile, chew on these trunked frequencies from Oregon.

Washington County, Oregon

11600 Special Events 1
11632 Special Events 2
11664 Special Events 3
25264 Portland Int'l Airport Ground Transportation
27824 Tri-Met Rail Maintenance West
27856 Tri-Met Bus Tac 3
27888 Tri-Met ICS
27920 Tri-Met Bus Maintenance
27952 Tri-Met Customer Service
27984 Tri-Met Rail Maintenance North
28016 Tri-Met Rail Tunnel
28048 Tri-Met Rail West Portal
28080 Tri-Met Fare Supervisors
28112 Tri-Met Fare Inspection
28144 Tri-Met Rail Maintenance East
28176 Tri-Met Rail Elmonica Yard
28208 Tri-Met Rail Main 1 (Eastside Trains)
28240 Tri-Met Rail Main 2 (Westside Trains)
28272 Tri-Met Rail Main 3 (Admin)
28304 Tri-Met Rail Ruby Junction Yard
28336 Tri-Met Rail Tac 1
28368 Tri-Met Rail Tac 2
28400 Tri-Met Rail Security
28432 Tri-Met Bus Dispatch
28464 Tri-Met Security
28496 Tri-Met Bus Tac 2
30704 Portland Police Bureau NE Tac 3
60208 is NOT carried on the Multnomah County trunk system, but IS on the Washington County system.

Police Call Business License Report: California

As the final touches are being put on the *Police Call 2000* edition of the book and new CD-ROM, below we have the first installment of what may be a regular feature of this column: a report sampling some of the data from the business section of the radio guide.

This month we've taken examples of new and renewed licenses from California (Volume 9). There are some real nuggets of information contained in what is known as, the "Beyond" section of *Police Call*. Below you'll see frequencies for the Richard Nixon Library, for movie studios, as well as frequencies for the L.A. Dodgers, San Francisco 49ers, and San Francisco Giants teams.

Notes: The transmitter type information (base/mobile/repeater) is provided in POLICE CALL, but not in this report.

Sample: Colleges

Licensee Name	Licensee City	Transmitter City	Frequency
California State University	Long Beach	Long Beach	451.7750
California State University	Long Beach	Long Beach	462.4750
California State University	Long Beach	Long Beach	462.5250
California State University	Long Beach	Long Beach	463.3250
California State University	Long Beach	Long Beach	463.6500
California State University	Long Beach	Long Beach	464.0750
California State University	Long Beach	Long Beach	464.8500
California State University	Sacramento	Sacramento	151.6550
California State University	San Marcos		856.4750
California State University	Turlock	Turlock	151.8050
Cerritos Community College Dist	Norwalk	Norwalk	464.4250
Cerritos Community College Dist	Norwalk	Norwalk	464.4750
Cerritos Community College Dist	Norwalk	Norwalk	464.5750
Claremont Colleges	Claremont		464.0375
Coast Community College District	Costa Mesa	Corona	461.4750



Contra Costa Community College	Martinez	San Pablo	154.5150
El Camino Community College Dist	Torrance	Torrance	154.6250
Evergreen Valley College	San Jose		154.5700
Evergreen Valley College	san Jose	Cupertino	484.2875

Sample: Schools

(Note: There has been a lot of licensing recently of schools and school districts. The suspicion is that there is increased interest in security equipment in the wake of the recent school shootings.)

Bakersfield City School District	Bakersfield		154.5700
Bakersfield City School District	Bakersfield		154.6000
Bakersfield City School District	Bakersfield		464.3875
Bakersfield City School District	Bakersfield		464.4125
Bakersfield City School District	Bakersfield		464.4375
Bakersfield City School District	Bakersfield		464.4625
Bakersfield City School District	Bakersfield		464.8875
Bakersfield City School District	Bakersfield		464.9625

Sample: Miscellaneous Organizations

Accident Research And Analysis	Santa Barbara		154.5700
Amateur Radio Emergency Services	Fremont		462.0625
Amateur Radio Emergency Services	Fremont		463.2375
Amateur Radio Emergency Services	Fremont		463.8875
Amateur Radio Emergency Services	Fremont		463.9375
Amateur Radio Emergency Services	Fremont		464.4625

Sample: Ambulances

Stat Medical Transportation Inc	El Cajon	Poway	935.1500
Stat Medical Transportation Inc	El Cajon	Poway	935.2250
Stat Medical Transportation Inc	El Cajon	Poway	935.2500
Stat Medical Transportation Inc	El Cajon	Poway	935.6375
Stat Medical Transportation Inc	El Cajon	Poway	936.7375

Sample: Hotels

Four Seasons Resort Aviara	Carlsbad	Carlsbad	451.9250
Four Seasons Resort Aviara	Carlsbad	Carlsbad	452.9750
Four Seasons Resort Aviara	Carlsbad	Carlsbad	451.4500
Hilton Hotel	Oakland		464.9750
Hilton Hotel	Oakland		469.4875
Hilton San Diego/Del Mar	Del Mar		464.4750
Hilton San Diego/Del Mar	Del Mar		464.5750
Holiday Inn At The Embarcadero	San Diego		154.6000
Hotel Nikko San Francisco	San Francisco		463.6750
Marriott Ontario Airport	Ontario	Ontario	452.2250
Marriotts Desert Springs Resort	Palm Desert	Palm Deser	461.4375
Marriotts Desert Springs Resort	Palm Desert	Palm Deser	461.8500
Marriotts Desert Springs Resort	Palm Desert	Palm Deser	464.9750

Sample: Newspapers

The Sacramento Bee	Sacramento	Sacramento	452.9750
The Sacramento Bee	Sacramento	Sacramento	851.9875
The Sacramento Bee	Sacramento	Sacramento	856.7875
The Sacramento Bee	Sacramento	Sacramento	857.7875

Sample: TV/Movies Production Companies

The Walt Disney Company	Anaheim	Anaheim	464.5750
The Walt Disney Company	Burbank		159.6000
The Walt Disney Company	Burbank		159.6750
The Walt Disney Company	Burbank		159.7200
The Walt Disney Company	Burbank		159.8250
The Walt Disney Company	Burbank		159.8550
Universal Studios Hollywood	Universal City		153.6350
Universal Studios Hollywood	Universal City		154.5700
Universal Studios Hollywood	Universal City		160.0200
Universal Studios Hollywood	Universal City		451.7625

Sample: Recreation, Conventions & Cultural Attractions

California Mid Winter Fair	Imperial		151.6550
California Mid Winter Fair	Imperial		154.5700
California Mid Winter Fair	Imperial		154.6000
Richard M Nixon Library	Yorba Linda		466.6125
Richard M Nixon Library	Yorba Linda		467.8500
San Fernando Valley Girl Scouts	Chatsworth	Frazier Pa	151.7450
San Francisco Convention Fclty	San Francisco		452.9750
San Francisco Convention Fclty	San Francisco		464.3250
San Francisco Convention Fclty	San Francisco		461.7000
San Francisco Convention Fclty	San Francisco		461.9750
San Francisco Convention Fclty	San Francisco		463.3500
San Francisco Museum Modern Art	San Francisco		464.0375
San Francisco Museum Modern Art	San Francisco		464.5125
San Francisco Museum Modern Art	San Francisco		452.0250
Santa Ynez Arabian Horse Assoc	Buellton		151.9250
Santa Ynez Arabian Horse Assoc	Buellton		151.9550
Sea World Inc	San Diego		461.1625
Sea World Inc	San Diego		461.6875
Sea World Inc	San Diego		461.7875
Sea World Inc	San Diego		462.8875
Sea World Inc	San Diego		463.6625
Sea World Inc	San Diego		463.6875
Sea World Inc	San Diego		463.7125
Sea World Inc	San Diego	Dulzura	462.8500

Sample: Property Management/Malls

South Coast Plaza	Cosa Mesa	Cosa Mesa	451.4500
South Coast Plaza	Cosa Mesa	Cosa Mesa	461.7250
South Coast Plaza	Cosa Mesa	Cosa Mesa	464.4250
South Coast Plaza	Cosa Mesa	Cosa Mesa	464.8250
South Shore Center	Alameda	Alameda	461.6250
South Shore Center	Alameda	Alameda	464.3250
Almaden Plaza Shopping Center	San Jose		151.8050
Bayfair Shopping Center	San Leandro	San Leandr	151.6550
Bayshore Mall	Eureka	Eureka	464.5250
Galleria At Tyler	Riverside	Riverside	464.3750

Sample: Sports & Stadiums

Los Angeles Dodgers	Los Angeles	Los Angeles	451.4000
Los Angeles Dodgers	Los Angeles	Los Angeles	451.4500
Los Angeles Dodgers	Los Angeles	Los Angeles	451.5000
Los Angeles Dodgers	Los Angeles	Los Angeles	451.7000
Los Angeles Dodgers	Los Angeles	Los Angeles	451.8750
Los Angeles Dodgers	Los Angeles	Los Angeles	451.9500
Los Angeles Dodgers	Los Angeles	Los Angeles	452.7250
San Francisco Forty Niners	Santa Clara		461.1375
San Francisco Forty Niners	Santa Clara		461.3875
San Francisco Forty Niners	Santa Clara		461.4375
San Francisco Forty Niners	Santa Clara		461.5125
San Francisco Giants	San Francisco		451.5500
San Francisco Giants	San Francisco		451.6000
San Jose Arena Management Corp	San Jose		461.1125
San Jose Arena Management Corp	San Jose		461.1625
San Jose Arena Management Corp	San Jose		461.7125
San Jose Arena Management Corp	San Jose		461.9625
San Jose Arena Management Corp	San Jose		463.2375
San Jose Arena Management Corp	San Jose		463.7125
San Jose Arena Management Corp	San Jose		466.4375
Santa Maria Speedway	Morro Bay	Nipomo	152.4200
Squaw Valley Ski School	Olympic Valley	Olympic Va	461.6750

Sample: Towing

Automobile Club Of Southern Ca	Los Angeles	Avalon	855.3625
Automobile Club Of Southern Ca	Los Angeles	Big Bear	853.6875
Automobile Club Of Southern Ca	Los Angeles	Big Bear	855.3375
Automobile Club Of Southern Ca	Los Angeles	Corona	853.6875
Automobile Club Of Southern Ca	Los Angeles	Corona	855.3375
Automobile Club Of Southern Ca	Los Angeles	Montrose	853.6875
Automobile Club Of Southern Ca	Los Angeles	Montrose	855.3375
Automobile Club Of Southern Ca	Los Angeles	San Diego	452.5250
Automobile Club Of Southern Ca	Los Angeles	San Diego	452.5750
Automobile Club Of Southern Ca	Los Angeles	San Diego	857.5250
Automobile Club Of Southern Ca	Los Angeles	San Miguel	150.9200
Automobile Club Of Southern Ca	Los Angeles	San Miguel	150.9650

Sample: Golf & Country Clubs

La Jolla Beach & Tennis Club Inc	La Jolla	San Diego	464.3750
La Jolla Beach & Tennis Club Inc	La Jolla	San Diego	464.5750
La Jolla Beach & Tennis Club Inc	La Jolla	San Diego	466.9125
Lake Merced Country Club	Daly City		154.6000
Las Posas Country Club	Camarillo		465.7250
Las Posas Country Club	Camarillo	Camarillo	452.8500
Los Serranos Country Club	Chino		467.8500
Meadow Lake Country Club	Escondido	San Diego	461.9750
Monterey Peninsula Country Club	Pebble Beach	Pebble Bea	452.7250
North Butte Country Club Inc	Sacramento		154.5700
North Kern Golf Club	Bakersfield		467.8625
Oakmont Country Club	Glendale	Glendale	451.1500
Oakmont Country Club	Glendale	Glendale	451.3000
Oakmont Country Club	Glendale	Glendale	451.4500
Oakmont Country Club	Glendale	Glendale	452.7250

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Highway Maintenance Service Allocations

This month's *Service Search* column will be taking an in-depth look at the new highway maintenance service frequency allocations currently being licensed by the Federal Communications Commission. Scanner listeners should be listening for newly allocated splinter channels (VHF 7.5 kHz/UHF 6.25 kHz) to become active in their areas.

With the increased inclement winter weather we are now experiencing, these highway maintenance allocations can be exciting frequencies to monitor road construction/snow removal operations.

33.02	Base or mobile	One-way paging on secondary basis
33.06	Base or mobile	One-way paging on secondary basis
33.10	Base or mobile	One-way paging on secondary basis
37.90	Base or mobile	
37.92	Base or mobile	
37.94	Base or mobile	
37.96	Base or mobile	
37.98	Base or mobile	
45.68	Base or mobile	
45.72	Base or mobile	
45.76	Base or mobile	
45.80	Base or mobile	
45.84	Base or mobile	
47.02	Base or mobile	State/Local only secondary basis to work with state
47.04	Base or mobile	State/Local only secondary basis to work with state
47.06	Base or mobile	State/Local only secondary basis to work with state
47.08	Base or mobile	State/Local only secondary basis to work with state
47.10	Base or mobile	State/Local only secondary basis to work with state
47.12	Base or mobile	State/Local only secondary basis to work with state
47.14	Base or mobile	State/Local only secondary basis to work with state
47.16	Base or mobile	State/Local only secondary basis to work with state
47.18	Base or mobile	State/Local only secondary basis to work with state
47.20	Base or mobile	State/Local only secondary basis to work with state
47.22	Base or mobile	State/Local only secondary basis to work with state
47.24	Base or mobile	State/Local only secondary basis to work with state
47.26	Base or mobile	State/Local only secondary basis to work with state
47.28	Base or mobile	State/Local only secondary basis to work with state
47.30	Base or mobile	State/Local only secondary basis to work with state
47.32	Base or mobile	State/Local only secondary basis to work with state
47.34	Base or mobile	State/Local only secondary basis to work with state
47.36	Base or mobile	State/Local only secondary basis to work with state
47.38	Base or mobile	State/Local only secondary basis to work with state
47.40	Base or mobile	State/Local only secondary basis to work with state
150.995	Base or mobile	
151.0025	Base or mobile	Bandwidth not to exceed 11.25 kHz
151.010	Base or mobile	
151.0175	Base or mobile	Bandwidth not to exceed 11.25 kHz
151.025	Base or mobile	
151.0325	Base or mobile	Bandwidth not to exceed 11.25 kHz
151.040	Base or mobile	
151.0475	Base or mobile	Bandwidth not to exceed 11.25 kHz
151.055	Base or mobile	
151.070	Base or mobile	25 kHz bandwidth authorized
151.085	Base or mobile	
151.0925	Base or mobile	Bandwidth not to exceed 11.25 kHz
151.100	Base or mobile	
151.1075	Base or mobile	Bandwidth not to exceed 11.25 kHz
151.115	Base or mobile	
151.1225	Base or mobile	Bandwidth not to exceed 11.25 kHz
151.130	Base or mobile	
151.1375	Base or mobile	Bandwidth not to exceed 11.25 kHz
156.045	Mobile	
156.0525	Mobile	Bandwidth not to exceed 11.25 kHz
156.060	Mobile	
156.0675	Mobile	Bandwidth not to exceed 11.25 kHz
156.075	Mobile	
156.0825	Mobile	Bandwidth not to exceed 11.25 kHz
156.105	Base or mobile	
156.1125	Base or mobile	Bandwidth not to exceed 11.25 kHz
156.120	Base or mobile	
156.1275	Base or mobile	Bandwidth not to exceed 11.25 kHz
156.135	Base or mobile	
156.1425	Base or mobile	Bandwidth not to exceed 11.25 kHz
156.165	Base or mobile	Assignment for licensees other than the state
156.1725	Base or mobile	Assignment for licensees other than the state/Bandwidth not to exceed 11.25 kHz
156.180	Base or mobile	Assignment for licensees other than the state
156.1875	Base or mobile	Assignment for licensees other than the state/Bandwidth not to exceed 11.25 kHz
156.195	Base or mobile	Assignment for licensees other than the state
156.2025	Base or mobile	Assignment for licensees other than the state/Bandwidth not to exceed 11.25 kHz
156.225	Base or mobile	Assignment for licensees other than the state
156.2325	Base or mobile	Assignment for licensees other than the state/Bandwidth not to exceed 11.25 kHz
156.240	Base or mobile	Assignment for licensees other than the state
156.2475	Base or mobile	Assignment for licensees other than the state/Bandwidth not to exceed 11.25 kHz
158.985	Mobile	Assignment for licensees other than the state
158.9925	Mobile	Assignment for licensees other than the state/Bandwidth not to exceed 11.25 kHz
159.000	Mobile	Assignment for licensees other than the state
159.0075	Mobile	Assignment for licensees other than the state/Bandwidth not to exceed 11.25 kHz
159.015	Mobile	Assignment for licensees other than the state
159.0225	Mobile	Assignment for licensees other than the state/Bandwidth not to exceed 11.25 kHz
159.045	Mobile	Assignment for licensees other than the state
159.0525	Mobile	Assignment for licensees other than the state/Bandwidth not to exceed 11.25 kHz
159.060	Mobile	Assignment for licensees other than the state
159.0675	Mobile	Assignment for licensees other than the state/Bandwidth not to exceed 11.25 kHz
159.075	Mobile	Assignment for licensees other than the state
159.0825	Mobile	Assignment for licensees other than the state/Bandwidth not to exceed 11.25 kHz
159.105	Mobile	Assignment for licensees other than the state
159.1125	Mobile	Assignment for licensees other than the state/Bandwidth not to exceed 11.25 kHz
159.120	Mobile	Assignment for licensees other than the state
159.1275	Mobile	Assignment for licensees other than the state/Bandwidth not to exceed 11.25 kHz
159.135	Mobile	Assignment for licensees other than the state
159.1425	Mobile	Assignment for licensees other than the state/Bandwidth not to exceed 11.25 kHz
159.165	Base or mobile	Assignment for licensees other than the state
159.1725	Base or mobile	Assignment for licensees other than the state/Bandwidth not to exceed 11.25 kHz
159.180	Base or mobile	
159.1875	Base or mobile	Bandwidth not to exceed 11.25 kHz
159.195	Base or mobile	
159.2025	Base or mobile	Bandwidth not to exceed 11.25 kHz

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US Armed Forces Radio on HF?

Football season always reminds me of AFRTS, the US Armed Forces Radio/TV Service, since it used to be such a great place to hear the big games with few or no commercials. For generations, AFRTS has entertained American personnel and their families overseas with slick, demographically programmed radio and TV, often straight from American commercial media. We listened in, too, on Voice of America feeders, until these went away in the late eighties.

For just over a year, though, AFRTS programs have been involved in the utility world's most confusing situation. This concerns the US Navy's rebroadcast of American Forces Network (AFN) and other AFRTS radio channels making up AFSTRS, the Armed Forces Satellite Transmitted Radio Service.

When three shortwave (HF) frequencies suddenly lit up with this service in June of 1998, AFRTS appeared to be as surprised as we were. At first, they tended to suspect an illegal, pirated downlink, then a naval exercise, and figured it would last a couple of months, tops. Over a year later, though, it continues on the frequencies of 4278.5, 6458.5, and 12689.5 kilohertz (kHz). These are all upper sideband (USB). Note that these are the "dial/window" frequencies that you see on most radios, not the official channel centers.

Recently, someone asked AFRTS about all this in e-mail, after seeing something in this column. It drew the curt answer that it was the Navy's broadcast, not theirs, and that this column should explain that. Well, we did explain it at least once, but many more people have since discovered these great broadcasts and become totally confused. Therefore, we're happy to explain it again.

What's happening is that selected channels in the AFSTRS are indeed coming from the US Naval Communication Station, Key West, Florida. It actually did start during an international training exercise in the Atlantic, when oceanic satellite coverage (via Marisat) proved lacking. Transmitters are on Saddlebunch Key, just east of Key West and its naval air station. This is one of the southernmost points in the continental US, and a perfect place to hit the Caribbean. Other activities include support for the "drug war" and antisubmarine operations.

While the broadcasts most definitely come from Key West, as shown by signal propagation and official stories, from the start there has been unconfirmable suspicion of occasional or continuous simulcasts from remote transmitters in Puerto Rico. Nobody knows this for sure. Authoritative sources have said contradictory things, and we're still going back and forth on this one.

Meanwhile the QSL (verification of reception) address remains what it always was: Commander, US Naval Communications Station, Key West Naval Base, Key West, FL 33040, USA. Many people have gotten QSLs from this address. As we mentioned above, don't bother AFRTS or AFN looking for wallpaper on this one!

All three of these frequencies are primarily maritime radio teletype (RTTY) allocations and show as such on the international tables. This means you hear a lot of the characteristic, bleepy interference from the licensed RTTY users. Recent checks on a simple portable receiver, however, showed all three channels as highly intelligible, if not quite party-entertainment quality.

In California, the 4 megahertz (MHz) tends to come up at night, and the 12 meg in daytime. The 6 is audible pretty much all the time, if up and down. Sometimes, the channels are in parallel, other times not. All the programs are unpredictable selections from the ten AFSTRS channels, though football schedules give a definite clue. Federal law requires AFRTS to punch out all the commercials, though it's doubtful too many listeners miss them. The dead air is filled with timely sports scores, and those chatty, Department of Defense announcements regarding base safety or military financial planning.

How long will this relay last? No clue. It wasn't supposed to last this long, but they're still working on the satellite coverage. Could be as late as fall of 2000, could be tomorrow. Hope it's not before this column runs in November!

The Millennium

It would be fun to say that this is the last "Y2k," or year-2000 software bug column of The Millennium, but it probably isn't. There'll most likely be a better one next month; if you get really picky the real Millennium doesn't change until the end of next year anyway.

Nobody knows what will happen, though, when all these computers change centuries. At least publicly, the US government is pretty well sure that panic will be the worst problem, if there's even a problem at all. However, emergency planners always prepare for the worst, and HF utility listening is going to be fun right up until this year ends.

Since satellite systems are among those that might fail, many emergency plans assume heavy HF use. I've seen a lot of new log-periodic antennas on federal buildings hereabouts. This is a good time to start checking all those federal emergency preparedness nets that meet on Wednesday mornings, local time, or around 1400 to 1600 coordinated universal time (UTC). Just about every agency with major HF capability holds one of these, and some have a second callup for the western time zones. Bulletins are commonly given out concerning drills or planned activations.

There'll be a lot more about these frequencies when they're all nailed down. See you next month.

Hugh Stegman

Abbreviations used in this column

AFB	Air Force Base
AM	Amplitude Modulation
ARQ	Automatic Repeat Request teleprinting scheme
AWACS	Airborne Warning And Control System
CAMSLANT	Communication Area Master Station, Atlantic
CAMSPAC	Communication Area Master Station, Pacific
Canforce	Canadian Forces
CIA	Central Intelligence Agency
COMSUBLANT	Commander, Submarine Forces, Atlantic
CW	Morse code telegraphy ("Continuous Wave")
EAM	Emergency Action Message, coded military orders
FEC	Forward Error Correction teleprinting scheme
FAX	Facsimile
JSTARS	Joint Surveillance Target Attack Radar System
LSB	Lower Sideband
MFA	Ministry of Foreign Affairs
Ops	Operations
RSA	Republic of South Africa
RTTY	Radio Teletype
SAM	Special Air Mission
UK	United Kingdom
Unid	Unidentified
US	United States
USCG	US Coast Guard
VFT	Voice Frequency Telegraphy (teleprinting)
VIP	Very Important Person

All transmissions are USB (upper sideband) unless otherwise indicated. All frequencies are in kHz (kilohertz) and all times are UTC (Coordinated Universal Time).

2500.0 BPM-Xian, China, with AM time pips and CW identifier at 1330. (Takashi Yamaguchi-Japan)

4350.0 TBB5-Turkish Navy, Ankara, calling TBDJ, at 2052. (Ary Boender-Netherlands)

4363.0 WOM-AT&T High Seas Radiotelephone, FL, with voice synthesized traffic list and bulletins, at 0100. Similar on 8722 at 1322. (Sue Wilden-IN) *Station was scheduled to leave air in October. More history goes away. -Hugh*

4500.0 AFA2QX-Possible US Air Force MARS, in net with test counts and callups at 0101. (Wilden-IN)

4773.0 Unid-North Korean female numbers voice, powerful AM at 1200, causing 3 kHz audio beat with usual 4770. Same with 5869, right below usual 5872. Transmitter malfunction? (Yamaguchi-Japan)

5170.0 CIO2-Mossad, Israel, with callup only, at 1945. (Yamaguchi-Japan) *The "2" on the ID usually means "no message." -Hugh*

5180.0 Cherta numbers station, unknown location at 2103. (Boender-Netherlands)

5422.0 Lincolnshire Poacher-British intelligence, Cyprus, with folk tune and numbers voice, also using 6845 and 8464, at 1800 and 1900. (Yamaguchi-Japan)

5696.0 Coast Guard 1712-US Coast Guard C-130H, FL, telling CAMSLANT Chesapeake that "flares" called in by a vessel were actually streaks from the meteor shower, at 0630. (Allan Stern-FL) CAMSPAC Pt. Reyes-US Coast Guard, CA, no joy from CG 1790, an HC-130 out of Sacramento, at 0042. "K-9-U"-USCG, probable H-60, reporting takeoff to CAMSLANT "in the red" (clear voice) but going to secure frequency 3E11, at 2210. (Ron Perron-MD)

6322.0 ZSC-Capetown Radio, RSA, CW identification in ARQ sync marker, at 0235. (Bob Hall-RSA)

6340.6 NMF-US Coast Guard, Boston, MA, with weak weather fax at 0240. (Hall-RSA)

6357.0 SAA-Karlskrona Radio, Sweden, general call at 2041. (Boender-Netherlands)

6360.7 FUX-French Navy, Le Port, with coded RTTY message, not listed frequency or speed, at 0300. (Hall-RSA)

6362.0 MGJ-British Royal Navy, Faslane, UK, with VFT bulletins at 1022. (Boender-Netherlands)

6465.0 UIW-Kaliningrad Radio, Russia, with CW navigation warnings at 2033. (Boender-Netherlands)

6498.0 PCD-Mossad, Israel, with callup and repeated numbers message, at 1730. (Yamaguchi-Japan)

6501.0 NMN-US Coast Guard CAMSLANT, VA, with weather and hurricane Bret updates, at 0001. (Wilden-IN)

6507.0 TBDJ-Turkish Navy, Istanbul, with CW marker at 2015. (Yamaguchi-Japan)

6513.0 HLS-Seoul Radio, Korea, with patches and melody mirror of Beethoven's *Ode to Joy*, at 1840. (Yamaguchi-Japan)

6604.0 New York Radio-NY Volmet, NY, with flying weather for US airports, at 0013 (Wilden-IN)

6645.0 Eastern Music Station-Arabic "numbers," source unknown, with AM carrier at 1800, then music at 1816, and female voice until 1825. Had the characteristic low modulation. (Yamaguchi-Japan)

6676.0 Sydney Volmet-Australian flying weather at 0634. (Tom Sevart-KS)

6715.0 Death Blow-Probably US military, working Easy Mark and Canadian Forces Halifax Military, at 0325. (Jeff Haverlah-TX)

6754.0 Trenton Military-Canadian Forces, Canada with weather, good signal at 0136. (Wilden-IN)

6758.0 MKL-British Royal Air Force, Kinloss, UK, CW broadcast at 1200. (Boender-Netherlands)

6765.0 Unid 5-letter CW code groups, at 1302. (Camillo Castillo-Panama) *All these are probably the Cuban "cut" number Morse, a spook. -Hugh*

6784.0 Unid 5-letter CW code groups, at 1302. (Castillo-Panama)

6785.0 Unid 5-letter CW code groups, at 1302. (Castillo-Panama)

6826.0 Unid 5-letter CW code groups, at 1302. (Castillo-Panama)

6854.0 Unid 5-letter CW code groups, at 1202. (Castillo-Panama)

6867.0 Unid 5-letter CW code groups at 1202, cut abruptly at 1208. (Castillo-Panama)

6945.0 The Czech Lady-Russian intelligence numbers, at 1250. (Boender-Netherlands)

6959.0 Lincolnshire Poacher-British intelligence, Cyprus, interference with China Radio International on 6960, also on 9251 and 11545, at 2100. (Yamaguchi-Japan)

7057.5 L9CC?-Unknown CW station, possibly Chinese, repeating "V CP17 DE L9CC," at 1957. Not a ham. (Yamaguchi-Japan) *Write 'em up, Intruder Watch. -Hugh*

7279.0 W5RNS-Amateur net control for hurricane emergency, at 0044 (Wilden-IN)

7889.0 Unid 5-letter CW code groups, at 1202. (Castillo-Panama)

8151.0 IGJ44-Italian Navy, Augusta, Italy, with RTTY bulletin at 2110. (Boender-Netherlands)

8190.0 Unid 5-number code groups, transmitted twice in CW, at 0226. (Castillo-Panama) *Good catch. Probably a new Russian spook. -Hugh*

8300.0 New Star Broadcasting, Taiwan, weird 4-figure AM numbers in Chinese, at 1230. (Sevart-KS)

8642.2 MGJ-British Royal Navy, Faslane, UK, with RTTY bulletins at 2050. (Boender-Netherlands)

8662.0 TAH-Istanbul Radio, Turkey, with CW traffic list at 2058. (Boender-Netherlands)

8665.0 XSG-Shanghai Radio, China, with CW general call at 2057. (Boender-Netherlands)

8776.0 Pen Wiper-US Strategic Command, with EAM broadcast, simulcast on 13155, at 0715. (Haverlah-TX)

8828.0 Honolulu Volmet, with Pacific flight weather at 0339. (Perron-MD)

8864.0 Unid aircraft calling New York Radio, told by Shanwick he was on the wrong frequency. (Wilden-IN)

8968.0 Presidio-US military, with EAM at 0141. (Ron Perron-MD)

8971.0 Gremlin 08-US Navy P-3, working "0-N-S," who had a British accent, at 0250. (Perron-MD)

8983.0 CAMSLANT Chesapeake-US Coast Guard, Norfolk, VA, taking ops normal from Stingray 2141, at 0136. (Perron-MD)

8992.0 White Ash-US Strategic Command, with a long EAM, simulcast on 11244, at 0134. (Haverlah-TX)

9016.0 Hickam-US Air Force Hickam Global, Hawaii, telling Titmouse, US military, that his digital traffic had been passed, at 0624. (Haverlah-TX)

9024.0 Saint Petersburg Aeradio, Russian, working unid aircraft at 1026. (Boender-Netherlands)

9251.0 Lincolnshire Poacher-British intelligence, Cyprus, with folk tune and numbers at 2100. (Boender-Netherlands)

Utility World Loggings (continued)

10100.8 DDK-Hamburg Meteorological, Germany, with RTTY weather at 1015. (Boender-Netherlands)

10144.0 DK0WCY-Geman amateur propagation beacon, CW at 1030. (Boender-Netherlands)

10204.0 Death Blow-US Strategic Command, working Easy Mark, moved to Z160 (6715 kHz) at 0259. (Haverlah-TX)

10248.0 8BY-French Intelligence, possibly Paris, with special CW callup "825ZCC1118/912," also 12075 and 14931, at 0240. (John Maky-AR)

10426.0 Lincolnshire Poacher-British intelligence, Cyprus, with numbers, also using 6900 and 11547, at 2000. (Yamaguchi-Japan)

10535.0 Unid-Russian Navy, with undecodable RTTY traffic at 1700. (Hall-RSA)

10648.0 YHF-Mossad, Israel, with callup and message, also on 7918, at 1600. (Yamaguchi-Japan)

10774.0 The English Man-Russian intelligence, with AM numbers at 2010. (Boender-Netherlands)

10780.0 Sentry 60-US Air Force E-3 AWACS recon aircraft, with patch to Tinker Ops, OK, canceling day's plan, at 1348. Razor 33-US Air Force JSTARS E-8C aircraft, with patch through Cape Radio, Cape Canaveral, FL, to Raymond 19, Robins AFB, GA, at 1604. (Stern-FL)

10820.0 VLB2-Mossad, Israel, with callup only, also on 12747 and 14750, at 2245. (Yamaguchi-Japan)

10952.0 HBD20-Swiss MFA, Berne, with encrypted ARQ messages to embassies at 1010. (Boender-Netherlands)

11175.0 Navy Lima Lima Teal 8-Unknown US Navy, calling Mainsail (general call) at 0119. Dexterity-US Strategic Command, calling Andrews at 0122. Marine 32-Probably US Marine Corps, trying to work Hickam at 0145 (Wilden, In) Jambo 27-US Air Force B-52, telling Mudbug Control (Barksdale AFB, LA) in patch via Elmendorf that he had a bird hit, would dump munitions and return early, at 0140. (Perron-MD) Portable-US Stratcom, probably a command post, with voice synthesized EAM for "all conferees," at 1432. PACAF 01-US Pacific Air Forces with commander aboard, went to 8992 for Andrews, at 2324. (Haverlah-TX)

11178.0 Charlie 2-Probable Dutch Navy, making 8 knots and working PJC (Dutch Navy, Curacao) with a hurricane report at 1154. (Perron-MD)

11181.0 SAM 206-US Air Force VIP flight, apparently involved with US embassy in Honduras, working Andrews at 1651. PACAF 01- US Air Force, trying to get a patch through McClellan to Andrews VIP, at 2244. (Haverlah-TX)

11229.0 WAR 46-US military Joint Alternate Command Post, in signal check with Handrail, the net control, at 1655. (Haverlah-TX)

11232.0 Canforce 2820-Canadian Forces aircraft, with patch for weather to Trenton Military at 0012. (Perron-MD) Unknown Canforce ground station, passing weather to aircraft, at 2126. (Wilden-IN)

11244.0 Dexterity-US Strategic Command, with several EAM broadcasts beginning at 1809. (Haverlah-TX)

11491.0 Unid-US CIA, testing with dummy groups of ascending numbers and audible transmitter adjustments, at 1400. Same station, different days, with test groups and adjustments, at 1500 and 1600. (Maky-AR)

11494.0 Handrail-US Strategic Command, in signal check with WAR 46 command post at 1653. (Haverlah-TX)

11580.0 The Counting Station-US CIA, with ten-counts and numbers at 2100. (Yamaguchi-Japan)

12075.0 8BY-French Intelligence, possibly Paris, with special CW callup "825ZCC1118/912," also on 10248 and 14931, at 0240. (Maky-AR)

12135.0 Cuban "Atencion" station, with 5-figure AM numbers at 0202. (Castillo-Panama)

12186.0 The English Man-Russian intelligence, AM numbers at 2000. (Boender-Netherlands)

12228.0 NAM-US Navy, Norfolk, VA, with RTTY messages from COMSUBLANT (Commander, Submarine Forces, Atlantic) at 2109. (Boender-Netherlands) *Some of these may have been part of international exercise SHAMOO HUNT 99. -Hugh*

12603.0 Lincolnshire Poacher-British intelligence, Cyprus, with folk tune and numbers voice, also using 6900 and 11547, at 2100. (Boender-Netherlands)

13110.0 WLO-Mobile Radio, AL, with voice synthesized weather at 1809. (Sevart-KS)

13161.0 HLS-Seoul Radio, Korea, with patches and *Ode to Joy*, at 1840.

13200.0 Pig Iron-US Strategic Command, calling McClellan Global at 2306. (Haverlah-TX)

13242.0 McClellan-US Air Force McClellan Global, CA, with EAM broadcast at 2011. (Haverlah-TX)

13264.0 Shannon Volmet, Ireland, with flying weather at 2024. (Yamaguchi-Japan)

13750.0 P7X-Unknown intelligence station, with data bursts and hand-sent CW numbers, making two-minute transmissions most days at 1330, 1400, 1430, and 1500. Same frequency as New Star Broadcasting, causing heavy interference in USA. Two operators, one pro and one learning code the hard way. (Maky-AR) *P7X might well indeed be a training station, and this is a new frequency for them. -Hugh*

13907.0 Unknown US military station, very weak, with EAM at 1841. (Haverlah-TX)

13921.0 MIW2-Mossad, Israel, on new frequency with callup only, also on 10970, at 2215. (Yamaguchi-Japan)

14160.0 RPFNG-Portuguese Navy, Alges, with RTTY message to Lisbon, at 1314. (Boender-Netherlands)

14325.0 National Hurricane Watch Net, with LSB *[?-Hugh]* weather warnings at 0039. (Wilden-IN). W4EHW-Amateur at National Hurricane Center, FL, passing info at 0136. (Perron-MD) *Callsign stands for "Early Hurricane Warning." -Hugh*

14487.0 Lincolnshire Poacher-British intelligence, Cyprus, with folk tune and numbers voice, also using 15682, at 1200 and 1700. kHz (Boender-Netherlands)

14577.0 The Counting Station-US CIA, with counts and numbers, also using 16198, at 1200. (Yamaguchi-Japan)

14739.0 The Counting Station-US CIA, with counts and numbers, also using 16198, at 1300. (Yamaguchi-Japan)

14931.0 8BY-French Intelligence, possibly Paris, with special CW callup "825ZCC1118/912," also 10248 and 12075, at 0240. (Maky-AR)

15034.0 Trenton Military-Canadian Forces, Trenton, with weather at 1530. (Sevart-KS)

15388.0 New Star Broadcasting-Taiwan numbers station, with daily schedules on the half-hour. This is the correct frequency, not 15385. Causes a 2 kHz audio beat with China National Radio on 15390. (Yamaguchi-Japan)

15682.0 Lincolnshire Poacher-British intelligence, Cyprus, with folk tune and numbers voice, also using 14487, at 1200. (Boender-Netherlands)

16198.0 The Counting Station-US CIA, with ten-counts and numbers, also on 14739, at 1300. (Yamaguchi-Japan)

16904.0 UDK 2-Murmansk Radio, Russia, ARQ Russian and English traffic with several ships, at 1640. (Hall-RSA)

16914.5 SPB83-Szczecin Radio, Poland, with FEC message listing all frequencies and modes in English, at 1700. (Hall-RSA)

17180.0 FUG-French Navy, La Regine, testing in RTTY at 1040. (Boender-Netherlands)

17499.0 Cherry Ripe-British intelligence, possibly Guam, with numbers, also using 22108, at 1300. (Yamaguchi-Japan)

17946.0 Tokyo-Tokyo Aeradio, Japan, working Northwest 69, first time this frequency, at 0404. (Yamaguchi-Japan)

18265.4 Zaire Bank Circuit-Private ARQ financial transaction network, in French, at 0730. (Hall-RSA)

18411.5 Deplu Djakarta-Indonesian MFA, with coded FEC message to Bogota embassy, at 1140. (Hall-RSA)

18415.0 8BY-French intelligence, Paris, with CW marker and "numbers," also on 20946, at 0916. (Yamaguchi-Japan)

19131.0 Atlas-US Drug Enforcement Agency/Customs comm center, helping aircraft "931" get clearance into Bolivian airspace. Also similar on 17937. (Chris Lummis-Canada) Atlas in radio checks with Flint 351 and 411 (both DEA aircraft), at 1509. (Perron-MD)

22818.5 EAE220-Spanish MFA, Madrid, with coded ARQ message to unknown embassy at 1615. (Hall-RSA)

23370.0 HZN50-Jeddah Meteorological, Saudi Arabia, with RTTY weather codes at 1233. (Hall-RSA)

23461.0 Cherry Ripe-British intelligence, probably Guam, with folk tune and "numbers," also on 20474, at 1000. (Yamaguchi-Japan)

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PSK - HF Digital's Brave New World (Part 1)

As we've hinted in past articles, the world of HF digital communications is changing quickly. Traditional FSK (frequency shift keying) systems are rapidly being replaced by those based on phase shift keying (PSK), and every few months seems to introduce a new type of system or some PSK adaptation of an existing system.

The move is fueled by powerful microprocessors and digital signal processing (DSP) which allow complex, robust modulation schemes, data compression and error correction techniques to be employed in the difficult environment of HF communications.

In today's world of web browsing and email, we all recognize the need for speed, and this is no more apparent in HF radio where many more complicating factors such as propagation come into play. Whereas fast FSK-based systems might move hundreds of bits per second across a link at best, the new PSK systems can achieve thousands of bits per second. Consequently, if you need to access the Internet across a radio link, these systems can open a whole new horizon.

Unfortunately, just as the widespread adoption of trunked radio systems stalled the scanning community for a long time, the same is also true of PSK's effect on the digital HF listener. Even top-of-the-line decoding equipment such as those from Hoka and Wavecom, contain only minimal tools for making sense of PSK systems. For the time being, we can just about identify system characteristics like speed, number of tones and so on – real decoding will take time in arriving, if ever, at the hobbyist's desk. Anyway, let's take a look at some of the systems you can commonly hear and identify.

PacTOR-II

Most listeners are familiar with PacTOR, developed by a group of German radio amateurs and since adopted by commercial, non- and quasi-governmental users like the UNO and MSF. The original Mark I system provided robust, reliable performance on HF with speeds of 100 or 200bps.

A Mark II modem can operate just like a Mark I, but by continuously measuring the quality of the link (by virtue of the data transfer and error correction rates), can change-up to a number of PSK modes allowing a maximum speed of 800bps. The change-up is unmistakable, replacing the normal FSK burble with a faster, more "buzzing" sound. You can hear a sample of this at:

http://rover.wiesbaden.netsurf.de/~signals/WAV/PACTOR-II.WAV

The key to identifying PacTOR-II is to recognize that the Mark II system uses the same selcal mechanism as the earlier modem. So, leave your normal PacTOR decoder on a PacTOR-II signal and wait for the selcal at the beginning of a transmission to appear. In many cases, you will be able to identify the user by this means. Often a regular CW identification is also sent by the modem, providing yet another clue.

PacTOR-II is used by Swiss Diplomatic Services, US Navy MARS, United Nations, International Red Cross, Sail Mail Association, and Pin Oak Digital. Check the following frequencies for PacTOR-II activity:

4555.5 6259.5 6855.5 8025.5 12379.5 13420.5 13560.5 13965.5 13971.0 13986.0 18066.4 18343.0 18370.5

2400 bd HF modems (STANAG4285, MIL-188-110A)

This family is probably the most commonly heard PSK-based system, even though it's commonly dismissed by some listeners as just "noise" or "interference." That in itself is a great description for the sound of this system. In continuous mode, the system sounds like a band (3 kHz) of chugging white noise. The system also exists in a burst mode, so you will hear a brief (between 1 and 20 seconds) burst of noise as the data is sent, and a shorter burst as the other end acknowledges the receipt.

Although originally specified by NATO Military standards committees, the 2400 bd HF modem has been adopted by other users. Chinese, Spanish and Swedish Diplomatic Services have migrated to this system or a system very similar, replacing aging 4+4, Twinplex, and SWED-ARQ equipment respectively.

The system is also sometimes preceded by 125bd 8-tone MIL-188-141A ALE (Automatic Link Establishment) bursts which are used to select and change frequencies according to prevailing propagation conditions.

Since no decoding equipment is available to hobbyists, the users of these systems were found by detective work and correlating the appearance of the new signals with channels previously occupied by the old systems. In some cases, both old and new systems co-exist on the same channels.

You can hear samples of the STANAG 4285 modem in continuous, burst and ALE modes by checking the following links:

http://rover.wiesbaden.netsurf.de/~signals/WAV/NATO2400.WAV
http://rover.wiesbaden.netsurf.de/~signals/WAV/STANAG4285_CZE.WAV
http://rover.wiesbaden.netsurf.de/~signals/WAV/MIL-STD-188-141A.WAV

The best place to hear this system is in the range 6200 to 6500 kHz where a great number of STANAG4285 examples from NATO Navy outlets can be heard, by day and night. Also check the following spot-frequencies for 2400 bd activity:

11023 11046 14390 14460 15946 16180 20960

As stated, decoding these signals has proven elusive so far, and tools for measuring the characteristics of PSK signals were only available to Code 30 users. Recently, Wavecom's W41pc v4.4 released a new series of tools that included a number of PSK modules. Of all the decoders available to your average hobbiest, Hoka's and Wavecom's offerings are the only units available to offer these types of sophisticated tools.

Next month we'll continue the look at Phase Shift Keyed systems and examine a few more common systems. If any digital signal fans have any information on PSK please email a note to the authors; we would enjoy hearing from you. Until then, happy listening.

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WBCQ Celebrates One Year

From Allan Weiner for **WBCQ** on its first anniversary: "It has been a fun year. Shortwave broadcasting is a wonderful alternative, and as a shortwave broadcaster it is exciting to bring all kind of different programs to the air. From Brother Stair to Radio New York International, the differing opinions are the spice of life. Also I have met and spoken with many people who love the art of radio and free expression, and I am honored to be able to help them obtain access to the airwaves the best I can. There are many more different programs to come.

"The first year did not go by without a few bumps: the betrayal of myself and the station by my former operations manager and unpaid bills by a few programmers (mostly religious clients). Technically, all has run smoothly, although September 3 the main transmitter lost its modulator damper diode. We scrounged around on the holiday weekend and rigged in a bunch of WWII radar damper tubes which work just great and glow ever so nicely. Harris wanted $5200.00 for a transmitter diode!

"I look forward to another year of doing what I love the most – radio. We are working on WBCQ-TWO, a second transmitter and antenna. This time a frequency agile one feeding into a 700 foot rhombic. Programming will hopefully go to a single network or programmer.

"I do my best to bring as diverse and interesting shows to WBCQ. It isn't easy. Many true alternative producers just do not have any money. I like to give programs gratis time but the electrical costs to run this beast are ghastly.

"Our station is a small family operation with myself, Elayne Star who runs the office, Tom Barna who runs the transmitter site, and the Timtron (Tim Smith) 'engineer extraodineer.' WBCQ is the best radio I have ever done and I thank all who listen and run programs on the station.

"Be well – all the best for another 1000 *World of Radios*!" (Allan H. Weiner, WBCQ Radio)

AUSTRALIA [non] RA started relays in Sept via Taiwan in order to reach western and central Indonesia, 250 kW at 205 degrees, Indonesian at 2300-2400 on 11550; will run for at least six months; may add more and some via Singapore later (Richard Jary, Australian Radio DX Club, *hard-core-dx*) A few days later RA added an English hour at 0900 also on 11550 via Taiwan (Mitsuo Yamada and Tooru Yamashita, Japan, Asian Broadcasting Institute)

AUSTRIA [non] From HFCC conference: In new B99 [winter] season ORF Vienna will introduce a new morning service towards WNAm at 1600-1700 using RCI Sackville facilities. At 0000-0300 ORF will remain on 7325, from Moosbrunn of course (Ernst Vranka, ORF interviewed by Wolf Harranth, via Wolfgang Büschel) The new relay frequency must have been selected at that time, but who cares?

RADIO ÖSTERREICH INTERNATIONAL

BOUGAINVILLE Clandestine on 3850, Radio Independence Bougainville is still having power difficulties and has reduced its schedule to *1000-1100*, ex *0900-1100* (Sam Voron, Australia, Aug 24 (c) *Cumbre DX)*

CENTRAL AFRICAN REPUBLIC 9900 - Radio Minurca is back on this frequency, poor reception requiring USB mode; at 1925 music, 1930 French mentioning Centrafrique many times in political debate, still going at 2010 (Mahendra Vaghjee, Mauritius, Sept 5)

The station's very accommodating Director, David Smith, advises that they have been struggling along over the past few months to keep SW going.

Signal in most of the country is not too bad. They are using: Micom transmitter on 9500 at 0600-1600, 5900 at 1600-0600; and 1 kW 9900, 24 hrs/day. The 125 Watter is picked up loud and clear in northern Cameroun, about 700 km NW of Bangui. 9900 is targeted east-west, and is heard well in Berberati in the west and Bangassou in the east. They did have a budget to buy a more powerful transmitter; however, the commissioning time line was too long, and they couldn't justify the purchase (they would have missed the key presidential election period).

Officially, this UN mission (MINURCA) ends on Nov 15 this year, and R. MINURCA is set to close at that time. They are working behind the scenes to come up with a viable plan that will keep radio here. David Smith advises that "it certainly wouldn't hurt if SWLs wrote to the UN's department of peacekeeping operations and highlighted the importance of SW information broadcasts. Reception reports, postcards and even a few photos of listeners are proudly displayed on our newsroom walls!" (Jerry Berg, *NU*, Sept 7 via *Electronic DX Press*)

CHINA [non] Voice of China broadcasts from Taiwan. It uses transmitters which at other times carry broadcasts from Taiwan's Central Broadcasting System (CBS, responsible for Taiwanese external broadcasts). Voice of China is reportedly operated by an organization called Foundation for China in the 21st Century and announces an address in California, USA. The radio was first observed in April 1991. A previously reported transmission at 2100-2200 UT on 15280 kHz is currently unconfirmed. Known schedule: 0830-0930 daily to Asia in Mandarin on 11940 (BBC Monitoring Sept 8) Confirmed at 0830, and the other broadcast is now heard at 2200-2300 on 15280 (Feodor Brazhnikov, Irkutsk, *Cumbre DX*)

COLOMBIA Caracol-Florencia reactivated on 6170 in mid-Sept, 1142-1202+ with full ID on the hour.

This may be why the clandestine Voz de la Resistencia, Comando Central was on new 6095 at *1130-1230* mixing with French [WSHB]; they also have trouble on the second broadcast at *2130-2230* I'm also hearing a very weak signal on 6240 at *1415-1500* from Voz de la Resistencia, Comando de Occidente. Meanwhile on the same date, Rdif. Nacional, 4955 and mediumwave had relativies sending messages to the kidnapped at 2340-2355 (Yimber Gaviria, Cali, *Mundo Radial*)

CUBA [and non] R. Martí switched from 5890 to 5985 at 0700-1200. I hypothesize: IBB decided 5985 was a good inband channel they should grab before someone else (Mexico during other(?) hours notwithstanding), especially since VOA Delano left it for 9770 after 1000 some months ago; more valuable than 5890. Also puts two Martí frequencies rather close together on Cuban Russian analog sets, easier to run across. After a couple of weeks the Cuban jammers attacked 5985, but for good measure also kept jamming vacated 5890. Cuba habitually runs jammers beyond Martí hours, so this will damage XERMX on 5985, despite Mexico's relatively friendly relations with Cuba (gh)

GERMANY Kai Ludwig and other DX reporters

All times UTC; All frequencies kHz; * before hr = sign on, * after hr = sign off; // = parallel programming; + = continuing but not monitored; 2 x freq = 2nd harmonic; B-99=winter season, Oct-Mar; [non] = Broadcast* to *or* for *the listed country, but not necessarily originating there.

are noting that Deutschlandradio Berlin is now transmitting on 6190 kHz. They are using the old transmitter from RIAS, a U.S. financed station that broadcast from West Berlin into East Germany when it was communist. RIAS used 6005, but that frequency is now used by a newer 100 kW Deutschlandradio transmitter. The old RIAS transmitter on 6190 is 20 kW, but Kai says it puts a better signal into eastern Germany than 6005. Also, the audio on 6190 is more punchy. Kai spoke to the engineers at the Berlin-Britz site. They said they hesitated cleaning the brittle insides of the 50-year old transmitter. They just turned it on, and after 16 years of silence, it works.

Another U.S. transmitter, at Holzkirchen, was originally a Radio Free Europe/RadioLiberty facility and its four shortwave and one medium wave transmitters are still used mainly by RFE/RL. Authorities in the nearby village of Valley may sue the United States government to prevent it from modifying the 1593 kHz medium wave antenna to improve reception in the Balkan region. The mayor of Valley claims that the incidence of cancer in the village is already higher than in other parts of Germany. The U.S. International Broadcasting Bureau Office of Engineering says that the Holzkirchen relay meets or exceeds every German and international radiation hazard standard. (Kim Elliott, VOA *Communications World* via John Norfolk)

GUATEMALA 4835 - Radio Tezulutlán, reported at 0330 by Jon Oldenburg, WI, with marimba. The marimba (similar to a xylophone, only with wooden "keys" rather than metal) is a traditional instrument throughout Central America, although it is only widely played on the radio in Guatemala (where it originated). The best ones are long and shaped like an "L" and require 7 or 8 men to play. Even small ones require three players. It's quite an experience to see and hear a marimba band play live. Yes, it is called a band, probably the only kind of band with just one instrument, even though there may be eight musicians. I have fond memories of doing Disco, the Twist and a Vienna Waltz (among other dances) to a marimba band at a party in Tegucigalpa, Honduras, many years ago (Don Moore, *Cumbre DX*)

GUYANA Voice of Guyana chief engineer can be heard on the amateur bands in the Carribus Connection Sunday mornings 1200-1300 on 14283 and weekdays 1100-1200 on 14267.5. His call sign is 8R1SG and his name is Ossie. (Patrick Travers, World DX Club, via Mike Barraclough)

HONDURAS HRMI on 5890 apparently starts around 0000 and switches off at 0600, times vary slightly. They have some English (religious) programs around 0515-0555. Also, 4910 La Voz de la Mosquitia is untraced here (Elmer Escoto, San Pedro Sula, Aug 19, *Cumbre DX*)

INDONESIA On 3144v Persona Dangdut is an amateur (pirate) that plays Dangdut songs in response to dedications. Judging by the location of the intended recipients (Bandung, Pasuruan, Kerawang), I think that this station is located on Java. Leaves the air at 1602, no address announced (Richard Lam, Singapore, *Cumbre DX*)

IRAN [non] V. of Mojahed, clandestine from Iraq, with 3 new freqs: v7850 v8350 v8850 at 0200-0600, 1500-1800 (*Paniview*, Rumen Pankov, Bulgaria, *BC-DX*)

IRAQ "Baghdad Radio Iraq International" at 1900 in English on 11786.94 kHz. With its usual lousy, low, very muffled and distorted/buzzy audio. Very hard to understand much. Frequency announcement/ID was right at 1900 UT. Transmitter dropping out a number of times just before 1900 (David Zantow, WI, *World of Radio*)

IRELAND [non] RTE via Merlin, 6155, UT Sun Sept 5 at 0143 check instead had EWTN (Joe Hanlon, PA) We tuned in and sure enough, again at 0148 IS and ID for "EWTN Global Catholic Radio" but not // WEWN in English on 5825 (7425 was in Spanish). Reception too poor here to tell if a feed mixup, or deliberate RTE programming, but at 0155 an Irish accent was back with "Radio One" ID; off at usual 0159:30* (gh) RTE, 6155 was broadcasting EWTN because it was a program about right wing-type radio programs. They also played that Pete Peters. I think the RTE program is called *World of Radio* (!) (Dave Hughes, Kansas City MO) Must have been RTE's *Wide World of Radio* mistakenly taped for later relay by Merlin (Finbarr O'Driscoll)

LATVIA MagicStar Radio in German tested via Latvian SW 5935 throughout the day. This was a pure engineering test. The Latvians asked MagicStar for permission to use their program for testing purposes and got it (Kai Ludwig, Germany, *BC-DX*) The responsible organization in Latvia will establish a relay service like Merlin Network One on 5935. It is intended to use the "Magic Star" digital satellite service from Germany as fill-in during times when the transmitter is not rented ("Radio-Redaktion" news service, via Ludwig, *BC-DX*)

LITHUANIA Radio Vilnius reported on 17th August that Lithuanian Radio and Television was facing a crisis and was $2 million in debt. The report said that it could mean the reduction of domestic and external services including the possible cancellation of the English service (Paul Watson, World DX Club via Mike Barraclough)

MADAGASCAR [non] Radio Netherlands web-site 20th August says Tamil-Oli Radio, IBC Tamil and Voice of Democratic Burma are now being carried via the RN Madagascar relay. Schedule is

1128-1228	17495	Tamil-Oli Radio
1429-1455	17550	Voice of Democratic Burma
1458-1525	17490	IBC Tamil

All 50 kWw at 055 degrees. (Mike Barraclough, England, Aug 21)

Tamil-Oli Radio is another London-based Tamil station, which until now was broadcasting on the European Astra direct-to-home satellite system only. This originates not from the rather old 300 kW Philips transmitters, which are already busy with own RNW programming at this times: 1130-1325 on 17580 and 21480, 1430-1625 on 9890 and 15590. Instead these broadcasts are aired towards 55 degrees with a power of 50 kW, so it is quite obvious that this is the new 50 kW transmitter, which is in use by AWR on 3215 (Kai Ludwig, Germany) Tamil Oli website, mostly in Tamil is **http://www.trt.net** (Mike Barraclough, BDXC E-Mail News)

MALAYSIA The Voice of Islam, Kuala Lumpur, has introduced a new service in English, at 0300-0555 UT on 15295, 9750 and 6175 kHz. Target believed to be Asia and Australia; 15295 with excellent signals here (Bob Padula, Melbourne, *Electronic DX Press*)

MONGOLIA V. of Mongolia has two websites, **http://www.mol.mn/mrtv/frword.html** and **http://www.angelfire.com/biz/mrtv/index.html** - with conflicting schedule info, both of which are wrong(!), two or three years out of date. At least the latter admits right at the top, "*Yes, I know it's out of date... I'll post the new frequencies when I get them*!" said Mark Ostrowski in 1997. "English ... Australia 1230-1300 12085 ..." In fact, English as of Sept was at 1200-1230 and on 12015, not 12085 when we heard them also giving presumably accurate other English times as: 1500 and 1900 on 12015 and 9720 (gh)



NETHERLANDS RN's English service is too clever for its own good in some of its slogans: "Water covers 2/3 of the Earth's surface; Radio Netherlands covers the rest." Are we supposed to believe that RN coverage is restricted to land areas? You can't get it at sea? I daresay there is no part of the globe not "covered" to some extent by this SW station with multiple relay sites, as is the case with all other major broadcasters. But if they insist, we must assume you've got to be landbound to hear RN... (gh)

NETHERLANDS ANTILLES RN Bonaire: In 1994 extra facilities were added to ensure that all three transmitters could now operate simultaneously. A fourth transmitter of 75 kW has recently been installed. This was formerly used by Deutsche Telekom, and has been converted by the Bonaire staff to carry out digital shortwave tests. The site has 22 antennas, all but one being directional. The main targets from this site are the Americas, West Africa, Australia and New Zealand. The Bonaire station employs currently employs a staff of 42, nearly all of whom are local people. Languages spoken include English, Dutch, Spanish and Papiamentu (RN website via John Norfolk, *Review Of International Broadcasting*)

NEWFOUNDLAND CKZN, 6160, St. John's carries a programme feed from CFGB-FM, 89.5 MHz, site listed by CBC as Happy Valley-Goose Bay – that's in Labrador, the mainland part of the province of Newfoundland. CFGB-FM is in fact a CBC Radio 1 outlet, so when CKZN is airing local programmes, such as in the morning, one would hear local news and weather for Labrador because the studio origination is from the Labrador station, not from CBN Radio 1 in St. John's (Dave Clark, Ont., *hard-core-dx*)

NORWAY NTA's new frequency manager is Mr. Ohta, a Japanese-Norwegian, taking over from Olav Mo Grimdalen Nov 1 (Joe Hanlon, *Review Of International Broadcasting*)

PAKISTAN R. Pakistan appears to have dropped the English Slow Speed Bulletin 1105-1120 and 1615-1630 (Noël Green, UKoGBaNI, *BC-DX*) Also dropped at 0230 (Wolfgang Büschel, *ibid.*)

PAPUA NEW GUINEA From the *National* of Sept 7, concerning the reactivation of Radio Simbu in Kundiawa, on 3355:

KUNDIAWA. The provincial radio station here resumed broadcast last Thursday after almost a year of closure, thanks to financial assistance from the Ambane government.

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Operations of Radio Simbu wound to a stop on Sept 9 last year because the station had used up all its allocated money. The government of former governor Simeon Wai did not allocate any funding for the radio station at the beginning of the year. This had forced station to stay closed for almost a year during which time the nine staff only collected their fortnightly pays but did no work.

Under the provincial government reforms, all provincial radio stations of the National Broadcasting Corporation had been transferred to provincial governments to operate and maintain. While some provincial governments have successfully taken over the added responsibility, others like Chimbu have relegated radio stations to the bottom of their priorities lists providing little or no funding for them.

Consequently, Radio Simbu and a several others have had to close operations for months cutting out for a vast majority the only line of communication and information delivery service.

A senior staff member of Radio Simbu said he was grateful to the provincial government for providing some money for them to resume operations, hopefully until the end of the year. (Matt Francis, Sept 7, *Electronic DX Press*)

PERÚ 5645.6, Radio COREMARCA at 0015-0130 from Bambamarca, ex Radio Cultural Amauta, ex L.V. de San Antonio; announced frequencies as 1430 AM, 101.1 FM and 5645 SW on 45 meters. Mailbag program at 0020 on UT Monday *Saludando al Oyente*, hosted by Eliodoro Chávez Bustamante. The name [Coremarca] is somewhat strange; I believe it may be an acronym for some organization (Rafael Rodríguez R., Bogotá, Colombia, *Mundo Radial*)

DST doesn't make much sense in the tropics where length of days are about the same all year around. Thus, not many tropical countries go on DST. Perú is an exception. When Perú started using DST about 8 or 10 years ago, many rural stations continued to announce and use standard time only. (Part of the reason is that DST doesn't make any difference to rural peasants who live by the sun not clocks. It's more relevant to urban life.) Of course, with some Peruvian stations not using DST, it was confusing for DXers, obviously, with Peruvian stations using two different time standards. I believe DST has been more accepted and is generally used on the air by all Peruvians now. (Don Moore, *hard-core-dx*)

PORTUGAL RDP - Radiodifusão Portuguesa - is beginning special broadcasts for the martyred territory of Timor Loro Sae, in Portuguese and in Tetum (language of Timor). The SW schedule is:

10.00 - 21.00 UTC - 17 740 kHz (16m) - 300 kW
10.00 - 11.00 UTC - 11 550 kHz (25m) - 250 kW
22.00 - 23.00 UTC - 11 550 kHz (25m) - 250 kW
21.00 - 10.00 UTC - 17 600 kHz (16m) - 300 kW

For more info, consult this website: **http://www1.rdp.pt/timor/index.htm**

But the station in Portugal which has distinguished itself the most in news coverage of the monstruous happenings in Timor Loro Sae is called TSF and can be heard via internet at: **http://www.tsf.pt** The words *Loro Sae* mean "Rising Sun" in Tetum (Fernando de Sousa Ribeiro, Oporto, Portugal, *radioescutas*)

11550 are the Taiwan relays. As Joe Hanlon observes, it seems unlikely the 16m band would hold up 24 hours a day on a Portugal-Timor circuit, but we were hearing 17600 fairly well with moderate fading from 2200 past 2300; included some rather haunting music (gh)

Transmissions to East Timor on 17600 and 17740 are direct from Portugal. The president of RDP, José Manuel Nunes, stated it's 24h, using its most powerful transmitter of 300 kW, at Pegões (about 80 km east of Lisbon). Also said he contacted the leader of the East Timorese Resistance, Xanana Gusmão, offering him the help of RDP to build a radio in the new country, including a network of transmitters throughout the territory. Certainly there will be at least one transmitter on the tropical band (Fernando de Sousa Ribeiro, Oporto, Portugal, *World of Radio*)

UKRAINE The last powerful transmitter (1000 kW) in Lvov was closed down on Sept 2. This transmitter had been used for the programs of Radio Ukraine International beamed to Australia (96 degrees) 0500-1200 on 21520 and for South America (238 degrees) 2200-0400 on 9945. Thus, another Ukrainian broadcasting centre is off the air. Mikolayev, Kharkov and Kiev (Bykovnyanskiy) had already been switched off some months ago. All of these have closed down due to financial reasons and lack of spare parts. There is only one active site left, at Brovary (Kiev) with four transmitters of [total?] power 100 kW. The remaining schedule in Sept for Brovary was: 5905 kHz 1700-0200 UT, 6020 2100-0500 and 0600-2000, 6130 0600-1600, 9560 1700-0100, 9620 0200-1600, 11840 0400-1700. Thanks to the Russian DX League for this news (*Electronic DX Press*)

U S A New show starting Aug 27 on WBCQ was *Pagan Potpourri*, with Helen and Roger, Fridays at 2130-2200 on 7415 [from Nov would be at 2230 barring further changes]. Includes music not heard on commercial radio; nature-oriented, spirituality, in time with seasons, holidays. She is very open to contributions from listeners, suggestions about content, even tapes; not a serious show, with humor. And went on to explain how pagans are nice people, not devil-worshipers, child-sacrificers. Originates in Milwaukee (gh)

Scream of the Butterfly, US pirate, was scheduled on **WRMI** 7465 on the first, third and fifth Saturdays in October, UT Sun -0400-0500. New address: Scream of the Butterfly, P.O.Box 1994, Rancho Cordova, CA 95741-1994 (Tony Vaughan, British DX Club E-Mail news) Time would shift from November to 0500-0600; also appeared other weeks as fill in Sept (gh)

Someone asked me recently if **WRNO** was currently active. Well, it was on a Saturday night, UT Sun Sept 5, tnx to Joe Hanlon tip, but off-frequency 7354.3v at 0145 with LSU football; weak, carrier unstable. Another sighting of WRNO! Must be them, weak with big hum, undermodulated (thank god) Brother Stair, unstable carrier around 7394.3v at 1253 past 1405 Sept 6; matches same offset from 7355 in previous logging. Don't frequency deviation standards apply any more to US SW stations? (gh)

WWCR frequency schedules 31 Oct to 30 Nov:

Transmitter 1, 46 degrees: 1100-1300 UT 12160 kHz, 1300-2200 15685, 2200-2400 9475, 0000-0500 3215, 0500-1100 3210 (Dec thru Feb changes 15685 to 9475 at 2100, 9475 to 3215 at 2300)

Transmitter 3, 40 degrees: 1400-2300 12160, 2300-1400 5070 (Dec thru Feb changes 12160 to 5070 at 2200) (WWCR plans as of 1 Sept)

Anticipated *World Of Radio* schedule on **WWCR** from November with times shifted after DST: Thu 2130 15685, Sat 1230 12160, Sun 0330, 0630 5070, Mon 0600 3210, Tue 1330 15685.

WTJC - A frustrated and discouraged Mr. Robinson told me that 9725 will *not* be this station's frequency. "Someone at the FCC made a mistake" and has now told them that they can't use this channel as it is occupied (presumably by TIAWR, Costa Rica). Robinson was looking to go out of band in the 9 MHz range and perhaps even down to 6 MHz (Hans Johnson, (C) *Cumbre DX*)

WJCR - Bethany lives! Gary Richardson tells me that they are using two Continental 50 kW transmitters that they bought from the city of Bethany (which took over the old VOA site) for $15,000, which Richardson described as scrap value. They did some minor repairs and put a new final and drive tubes in them and they work fine. Current programming plans call for the same output on both channels. They are running low power right now, about 25 kW, and are waiting for FCC approval to go to full power of 50 kW (Hans Johnson (C) *Cumbre DX*)

VATICAN Current HF facilities for the Vatican Radio at Santa Maria di Galeria are:



- two 500 kW Telefunken transmitters
- two 250/500 kW Asea Brown Boveri transmitters
- two rotatable antennas - one is 76m high and 85m diameter, the other is 106m high and 87m diameter
- five 100 kW transmitters
- 28 fixed horizontal curtain antennas
- one log periodic rotating antenna

Santa Maria di Galeria is about ten times the area of Vatican State, and is 20 km from Rome. Five transmitters are in regular operation from the Marconi building on the Vatican hill – two on medium wave, and three on SW (fed to logarithmic rotating antennas). The technical centre is in the Vatican State, in what was formerly Pope Leo XIII's villa, attached to a medieval tower.

Annual operating costs for Vatican Radio are in excess of US$22 million, with no advertising income. There are over 200 journalists from 60 countries, and some 150 technical staff, working in 14 studios and control rooms. Many VR programs are available via the Internet, either live or as RealAudio files, at: **http://www.wrn.org/vatican-radio/audio.html** News Bulletins are available live at: **http://www.vatican.va** (Vatican Radio via *Electronic DX Press*)

VIETNAM [non] A new, private, California-based broadcaster, Radio Free Vietnam, is now leasing time on KWHR in Hawaii, at 1500 to 1530 on 9930. This is, intentionally, just after the Radio Free Asia Vietnamese Service is relayed via KWHR, at 14 to 15, on the same frequency. Hans Johnson of *Cumbre DX* reports that the organizers of the group are hoping that listeners will think that they have official U.S. government backing. The irony of this is that Radio Free Asia takes pains to distance itself from the U.S. government, pointing out that, although U.S. government funded, it is a private corporation whose staff does not include any government employees (Kim Elliott, VOA *Communications World* via John Norfolk) A source working in Vietnamese radio in the Bay area says Radio Free Vietnam is a new one and the organization had a fund raiser in the San Francisco area during the weekend of Aug 21-22. They have formed a political party (Hans Johnson, *Cumbre DX*)

Until the Next, Best of DX and 73 de Glenn!

Broadcast Loggings

GLOBAL FORUM

Gayle Van Horn

0000 UTC on 11850
SERBIA: Radio Yugoslavia. Interval signal to ID and report on Milosovic. (William McGuire, Cheverly, MD) Station URL: **www.radiovu.org/**

0005 UTC on 4945
BOLIVIA: Radio Illimani. Spanish international news to ID. SINPO 34323. Bolivia's **Radio Eco** 4702, 0035-0045; Tentative on **Radio Villamontes** 4599.9 kHz, 0050-0105 UTC. (Michael Schnitzer, Hassfurt, Germany/*Hard Core DX*)

0020 UTC on 6535.6
PERU: Radio Difusora Huancabamba. Peruvian huayno music at tune-in to station jingle, ID to local time check 0030. Peru's **Radio La Hora** 0030-0045 UTC, 4855.5 kHz with soccer commentary to ID break. **Radio Super Nueva Sensacion** 0138-0145, 66675.6 with IDs and evening greetings. (Sam Wright, Biloxi, MS)

0020 UTC on 5018.7
PERU: Radio Horizonte. Spanish. Promotional for local events to 0030 ID. Peruvian band scan produced: **Radio Quillabamba** 5025 kHz, 0020-0030 UTC; **Radio Cusco** 6195.5, 0135-0145; **Radio Difusora Paraton** 6955, 2325-2345; **Ondas del Rio Mayo** 6797, 2345-2355; **Radio Paucartambo** 6520.3, 2355-0005.(Schnitzer, Germany/*HCDX*)

0030 UTC on 9795
IRAN: VOIRI. Newscast to *Listener's Special* mailbag program, good signal quality. (Jim Boynton, Newton, MA)

0100 UTC on 9560
HUNGARY: Radio Budapest. Report on Hungarian festivals. (McGuire, MD; Mark Humenyk, Canada/*Worldwide DX Club*) URL: **www.kaf.radio.hu/indexa.html** *Effective October 31st, all transmissions are one hour later for winter. - ed.*

0105 UTC on 9570
CHINA: China Radio Int'l. Economic news, world news and item on Taiwan. (McGuire, MD) World news, // 17555 fair quality. (Boynton, MA) English 7590 at 2025. SINPO 22332. (Zacharias Liangas, Thessoliniki, Greece/*HCDX*)

0110 UTC on 5952.5
BOLIVIA: Radio Pio XII. Aymara/Quecha. Radio drama play to Andean music. SINPO 32322. Bolivia's **La Cruz del Sur** 2325-2335 UTC, 4875 kHz with Bolivia ID and presumed religious text in Aymara. (Michael Schnitzer, Hassfurt, Germany/*HCDX;* Robert L. Wiekner, FL/*WWDX*)

0200 UTC on 7210
BELARUS: Radio Minsk. Interval signal to ID/freq quote and national news. (McGuire, MD) URL: **www.nestor.minsk.by/radiod/indexen.htm** *Effective October 31st, all transmissions are one hour later for winter. - ed.*

0330 UTC on 7205
CONGO-KINSHASA: La Voix du People, Lumbumbashi. Sign-on with presumed national anthem and text. French ID at 0411 with day/date, announcer's name and chat. Station noted to 0420, then covered by BBC sign-on. Heard 1858 when Poland went off the air to BBC's *1920. (Mahendra Vaghjee, Rose Hill, Mauritius)

0333 UTC on 5026.3
UGANDA: Radio Uganda. Vernacular news and male's program comments. "Radio Uganda...Kampala" identification. SINPO 34333. (Nicolas Eramo, Buenos Aires, ARG/*TFW*)

0358 UTC on 7245
ANGOLA: Radio Nacional. National anthem to sign on ID/freq quote. Time pips at 0400 and ID repeat into vernacular text, good reception. (Vaghjee, MAU)

0402 UTC on 9435
ISRAEL: Kol Israel. USA newscast topics to national finance report. (McGuire, MD) News to editorials 17545, 1900 (Edwin Gentry, VA) English 17615 at 1411. (Gerhard Widera, Fulda, Germany; Wolfgang Buschel, Stuggart, Germany/*WWDX*)

0500 UTC on 6110
JAPAN: NHK/Radio Japan. International news to *Hello From Tokyo* program. (Boynton, MA)

0600 UTC on 15515
AUSTRALIA: Radio Australia. Fair to good signal quality for world and regional news into *Feedback* show, noted 0700+ on // 9660, 15240, 17580. (Boynton, MA)

0603 UTC on 4915
GHANA: Radio Ghana. National news to ID "this news comes to you from Radio Ghana, Accra." (Tom Banks, Dallas, TX)

0900 UTC on 15210
CHINA: China Radio Int'l. World news, // 17555 with fair signal quality. (Boynton, MA) English noted 7590, 2025, SINPO 22332. (Zacharias Liangas, Thessoliniki, Greece/*HCDX*)

0938 UTC on 4785
BRAZIL: Radio Caiari. Portuguese. Soft Braz pops to ad/promo to 0941 ID. Morning rooster effects with DJ's morning show. Full "canned" ID 0943. Best heard in a while and not heard at this time everyday. Brazil's **Radio Novas de Paz** 0951-1000 9514.92, // 11724.96. (Dave Valko, PA/*Cumbre DX/The Four Winds*).

1101 UTC on 13650.05
NORTH KOREA: Radio Pyongyang. Open carrier noted 1101 to interval signal, English ID from male/female duo and English newscast with North Korean slant. Very weak and barely audible. Drifting up to 13650.07 by tune out. (Valko/*Cumbre DX/TFW*) Frequency usage can be erratic, English schedule: 0000-0100 UTC: 3560, 11845, 13650, 15230 kHz; 0500-0600: 11710, 13790; 1100-1200: 3560, 9640, 9850, 9975, 11335, 13650; 1500-1600: 3560, 9640, 9975, 11335, 11735, 13650; 1800-1900: 6575, 9335, 11710, 13760; 1900-2000: 6520, 9600, 9975; 2100-2200: 6575, 9335, 11710, 13760; 2300-0000: 11335, 13760, 15130. (*BBCM*//KRERX000)

1500 UTC on 7074
SOMALIA: Radio Hargeisa. Station's freq move from ex 7071, very poor reception. Somalia's **Radio Holy Koran** 1600-1900, 6900; **Radio Mogadishu-Voice of Somali Pacification** 1600-1900, 6859v (ex 6820-6815) **Radio Mogadishu-Voice of the People** 1500-1900, 7088 (ex 7060), 1500-1900 in Somali, English, Arabic on 6690v, also 0400 in Somalian. (Vaghjee, MAU)

1558 UTC on 12160
USA: WWCR. Discussion on Grundig radios. (Sue Wilden, Noblesville, IN)

1600 UTC on 7161
IRAQ: Mother of Battles Radio. Arabic. Regional music to Holy Koran recitations and station ID, "*Idha'at umm al-ma'rik, Idha atu kul al-arab*." Military music (presumed national anthem) and time pips to 1900*. (Vaghjee, MAU)

1620 UTC on 12115
KAZAKHSTAN: Kazakh Radio. Russian text including music vocals to newscast and lite pops. "Kazakh Radio" discernable under electronic music and closing sign-off hymn 1700. Fair signal initially, improving by 1645. (Liangas, GRC/*HCDX*)

1620 UTC on 7080v
AFGHANISTAN: Voice of Sharia (Tent). Initially, station was not heard for several days after a month when reception had been clear, but audio was distorted. Signal returned on ex 7200 albeit weak and covered by Radio Japan at 1635. (Vaghjee, MAU)

1930 UTC on 11965
CLANDESTINE: Voice of Palestine. Noted on // 11735, 13645, 1080, noting 11965 best copy. Arabic ID to freq quote 1938 amid patriotic background music. (Vaghjee, MAU)

1953 UTC on 11804
BRAZIL: Radio Globo. Portuguese. Two announcers' on-air discussion to commercials/jingles and station ID. Signal's SINPO=34433. Brazil's **Nacional-Arhangguera** audible 11830, 2353 with religious text, signal noted over **Radio Romania Int'l**. (Liangas, GRC/*HCDX*)

2212 UTC on 9615
BRAZIL: Radio Cultura. Portuguese talk, mentions of Sao Paulo and station identification. Lite pops, jazz tunes and many mentions of Brazil, SINPO 23332. (Liangas, GRC/*HCDX*)

2331 UTC on 4918
PERU: Radio Cora del Perú. Spanish station jingles and IDs for fair signal quality. (Liangas, GRC/*HCDX*)

2344 UTC on 9385
USA: WEWN. Discussion of one lady's personal experience with abortion, and her work with *Priests For Life*. (Wilden, IN)

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Additional addresses for domestic stations may be found in the *Passport to Worldband Radio*, *Addresses Plus* section. AIR's replies can be erratic; however, it is indeed, worth the patience!



South Asia Radio Guide (SARG)

http://ourworld.compuserve.com/homepages/wwdxc/ is a biannual non-commercial newsletter published in November and May each year, specifically designed for those interested in radio listening and reception from the Indian subcontinent and South Asia. Links include *English and Language Services*, *Frequency Database*, *All India Radio,* as well as a large section of *Radio Links*. Check out their website for news and updates.

UDXL (Universal DX League) is the only active DX club in South Asia, and publishes a quarterly bulletin called *DX Post*. Annual subscription is $10.00 US (and worldwide) and Rs 50.00 (in India). Write the coordinator for additional details. Kanwarjit Sandhu, P.O. Box 1128, Sector -15, Chandigarh-160 015, India.

DXing India...what a heavenly catch for prime winter DX!

AZERBAIJAN

Radio Baku, 4940 kHz. No verification data in personal letter signed by Kamil Mamedov. Letter invited me to take part in their quiz "What Do You Know About Azerbaijan," first prize a visit to Baku. Received in 40 days for an English report. Station address: Medhi Huseyin Kucasi 1, 370011 Baku, Azerbaijan. (Bettabarba, Italy/*Play DX*/*The Four Winds*)

INDONESIA

RRI Banda Aceh, 3905 kHz. Indonesian verification on station letterhead signed by Parmono Prawira-Technical Director. Received for an Indonesian report. Station address: Kotak Pos No. 112, Banda Aceh, Aceh, Indonesian. Return postage helpful-ed. (Mika Makelainen, Finland/*Cumbe DX*)

LAOS

Laos National Radio, 6130 kHz. Full data form letter signed by Ms. Malivarn-English Section. Received for a taped report. Station address: Laotian National Radio & TV, Boite Postal 310, Vientiane, Laos. (Mickey Delmage, Edmonton, Alberta, Canada)

MALTA

The Voice of Africa, 15415 kHz. Full data card unsigned. Received for an English report. Station address: P.O. Box 17, Hamrun, Malta. (Gerald Edwin Gentry, VA)

MEDIUM WAVE

Macedonian Radio 810 AM. Full data personal letter signed by Vojko Rafajlovski-Redakteur, plus tape of Macedonian music. Received in 33 days for a follow-up report from 1998. Station address: Goce Delcev bb 91000 Skopje, Macedonia. (Canonica Daniele, Switzerland)

KANM 970 kHz AM. Verification letter signed by initials B.B. Received in 130 days for an AM report. Station address: 1581 Cummins Dr., # 135, Modesto, CA 95358. (Patrick Martin, Seaside, OR)

KIHM 1590 kHz AM. Verification letter signed by Jerry J. Usher-Director of Programming. Received in 21 days for an AM report. Station address: Immaculate Heart Radio, P.O. Box 70685, Reno, NV 89570. (Martin, OR)

KKWY 1630 kHz AM. Cheyenne, WY. QSL via email from Paul Montoya-Owner, *PaulMontoya@aol.com* - for an AM email report in 15 days. Per verie, the station only uses 1 kW day and night, and they are working on their antenna system. (Martin, OR)

KNDK 1080 kHz AM. No data letter signed by Jen Taylor-Program Director, plus coverage map. Received in 21 days for an AM report. Station address: Rt 5, Langson, ND 58249. N.D. QSL # 14. (Martin, OR)

KSTN 1420 kHz AM. Full data letter signed by Paul Shinn-Chief Engineer. Also enclosed the transmitter tube used during the recent DX Test. Noted, I am the winner of the station contest. The filament used 6.3V at 72 amps! What a neat gift especially since it arrived on my birthday! Received in 63 days for a taped AM report. Station address: 2141 Ralph Avenue, Stockton, CA 95206. (Martin, OR) *Pat, I don't think I could top this one! - ed.*

WJVA 1620 kHz AM. Full data verification letter signed by Rebecca L. Dolglaw. Received in 100 days for a taped AM report. Station address: 2010 S. Michigan St., South Bend, IN 46613. (Martin, OR)

WRUN 1700 kHz AM Miami Springs. Partial data letter signed by Adriana Grillet-Vice President, plus station T-shirt and network info sheet including a list of their stations. Received in 21 days for an AM report. Station address: Radio Unica, 8400 NW 52nd St., Suite # 101, Miami, FL 33166. (Martin, OR)

PAKISTAN

Radio Pakistan, 15530 kHz. Full data logo card signed by Iftikmar Hussain Malik-Senior Broadcast Engineer, plus personal letter and magazine *Pakistan Calling*. Received for an English report, one IRC. Letter states, "please no currency, IRCs only." Station address: Pakistan Broadcasting Corp., Frequency Management Cell, National Broadcasting House, Constitution Ave., Islamabad, Pakistan. (Gentry, VA)

PERU

Radio Union, 6115 kHz. Full data large logo card signed Carlos A. Gonzalez Solimano-Director Gerente, plus pennant and two decals. Received in 88 days for a taped report. Station address: Apartado 833, Lima 27, Peru. (Delmage, CAN)

SPAIN

Radio Exterior de España, 15385 kHz. Full data logo card initialed, plus photos. Received for an English report. Station address: Apartado de Correos 156.202, E - 28080 Madrid, Spain. (Sonny Baca, New Mexico/*Cumbre DX*)

TIS/TRAVEL INFORMATION STATION

Los Angeles Int'l Airport/LAX, 1700 kHz. Full data prepared QSL card signed with illegible signature. Received in 32 days for a utility report. Station address: State of California, Dept. of Transportation, Box 942874, Sacramento, CA 94274-0001. (George H. McCarthy, San Diego, CA)

YEMEN

Republic of Yemen Radio, 9780 kHz. Full data *Local Buildings* scenery card signed by Al Tashi Ali Ahmed-Technical Director, plus personal letter and postcard. Received in 91 days for an English report. Station address: Ministry of Information, P.O. Box 2371, San'a, Yemen (or) P.O. Box 2182, San'a, Yemen. (Delmage, CAN)

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How to Use the Shortwave Guide

0000-0100 twhfa USA, Voice of America 5995am 6130ca 7405am 9455af
① ② ⑤ ③ ④ ⑥⑦

Convert your time to UTC.

Broadcast time on À and time off Á are expressed in Coordinated Universal Time (UTC) – the time at the 0 meridian near Greenwich, England. To translate your local time into UTC, first convert your local time to 24-hour format, then add (during Daylight Savings Time) 4,5,6, or 7 hours for Eastern, Central, Mountain or Pacific Times, respectively. Eastern, Central, and Pacific Times are already converted to UTC for you at the top of each page.

Note that all *dates*, as well as times, are in UTC; for example, a show which might air at 0030 UTC *Sunday* will be heard on *Saturday* evening in America (in other words, 8:30 pm Eastern, 7:30 pm Central, etc.).

Find the station you want to hear.

Look at the page which corresponds to the time you will be listening. On the top half of the page English broadcasts are listed by UTC time on À, then alphabetically by country Â, followed by the station name Ã. (If the station name is the same as the country, we don't repeat it, e.g., "Vanuatu, Radio" [Vanuatu].)

If a broadcast is not *daily*, the days of broadcast Ä will appear in the column following the time of broadcast, using the following codes:

Day Codes

s	Sunday
m	Monday
t	Tuesday
w	Wednesday
h	Thursday
f	Friday
a	Saturday

In the same column Ä, irregular broadcasts are indicated "tent" and programming which includes languages besides English are coded "vl" (various languages).

Choose the most promising frequencies for the time, location and conditions.

The frequencies Å follow to the right of the station listing; all frequencies are listed in kilohertz (kHz). Not all listed stations will be heard from your location and virtually none of them will be heard all the time on all frequencies.

Shortwave broadcast stations change some of their frequencies at least twice a year, in April and October, to adapt to seasonal conditions. But they can also change in response to short-term conditions, interference, equipment problems, etc. Our frequency manager coordinates published station schedules with confirmations and reports from her monitoring team and *MT* readers to make the Shortwave Guide up-to-date as of one week before publication.

To help you find the most promising signal for your location, immediately following each frequency we've included information on the target area Æ of the broadcast. Signals beamed toward your area will generally be easier to hear than those beamed elsewhere, even though the latter will often still be audible.

Target Areas

af:	Africa
al:	alternate frequency (occasional use only)
am:	The Americas
as:	Asia
au:	Australia
ca:	Central America
do:	domestic broadcast
eu:	Europe
me:	Middle East
na:	North America
om:	omnidirectional
pa:	Pacific
sa:	South America
va:	various

Consult the propagation charts.

To further help you find a strong signal, we've included a chart on page 60 which takes into account conditions affecting the audibility of shortwave broadcasts. Simply pick out the section of the chart for the region in which you live and find the line for the region in which the station you want to hear is located. The chart indicates the optimum frequencies (in megahertz-MHz) for a given time in UTC. (Users outside North America can use the same procedure in reverse to find best reception from North America.)

Choose a program or station you want to hear.

Some selected programs appear on the lower half of the page for prime listening hours – space does not permit 24-hour listings. Our program manager changes the stations and programming featured each month to reflect the variety available on shortwave, though BBC programs are almost always included.

Occasionally program listings will be followed by "See X 0000." This information indicates that the program is a rerun, and refers to a previous summary of the program's content. The capital letter stands for a day of the week, using the same day codes as in the frequency listing (see above), and the four digits represent a time in UTC.

MT Monitoring Team

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SWL Programs

Jim Frimmel, Programming manager

Sundays

0000	Marie Lamb via KWHR (Angel 3): "DXing with Cumbre"
0000	Vatican Radio: "On-the-Air"
0021	Radio Exterior de Espana: "Radio Waves"
0045	BBC (am/eu): "Waveguide" (4)
0045	BBC (am/eu): "Write On"
0110	HCJB (am): "DX Partyline"
0121	Radio Exterior de Espana: "Radio Waves"
0130	Glenn Hauser via RFPI: "Continent of Media"
0136	Radio Havana Cuba: "DXers Unlimited"
0200	Kim Elliott via WWCR #3: "Communications World ABC"
0200	Glenn Hauser via RFPI: "World of Radio"
0258	Vatican Radio: "On-the-Air"
0300	Marie Lamb via WHRI (Angel 2): "DXing with Cumbre"
0330	Australia, Radio: "Feedback"
0330	Glenn Hauser via WWCR #3: "World of Radio"
0336	Radio Havana Cuba: "DXers Unlimited"
0345	Radio Bulgaria: "Radio Bulgaria Calling"
0400	Radio Mexico Intl: "DXperience"
0400	WWCR #3 (Tennessee): "Spectrum (live)"
0410	HCJB (am): "DX Partyline"
0423	Voice of Turkey: "DX Corner" (biweekly)
0430	Marie Lamb via WHRI (Angel 2): "DXing with Cumbre"
0521	Radio Exterior de Espana: "Radio Waves"
0536	Radio Havana Cuba: "DXers Unlimited"
0600	Marie Lamb via KWHR (Angel 3): "DXing with Cumbre"
0608	Vatican Radio: "On-the-Air"
0630	Glenn Hauser via WRN1: "World of Radio"
0730	Glenn Hauser via WWCR #3: "World of Radio"
0804	Radio Vlaanderen Intl: "Radio World"
0830	Marie Lamb via WHRA (Angel 5): "DXing with Cumbre"
0836	Radio Korea: "Multiwave Feedback"
0905	BBC (am/eu): "Waveguide" (4)
0905	BBC (am/eu): "Write On"
0930	Glenn Hauser via RFPI: "Continent of Media"
0930	Italy (AWR): "Wavescan"
1000	Marie Lamb via KWHR (Angel 4): "DXing with Cumbre"
1000	Glenn Hauser via RFPI: "World of Radio"
1038	Radio Korea: "Multiwave Feedback"
1045	WWCR #3 (Tennessee): "Ask WWCR"
1045	BBC (af): "Waveguide" (4)
1045	BBC (af): "Write On"
1207	Radio Canada Intl: "The Mailbag"
1230	BBC (as): "Waveguide" (4)
1230	BBC (as): "Write On"
1230	Italy (AWR): "Wavescan"
1234	Radio Vlaanderen Intl: "Radio World"
1238	Radio Korea: "Multiwave Feedback"
1300	Marie Lamb via KWHR (Angel 4): "DXing with Cumbre"
1300	WRMI (Florida): "Wavescan"
1336	Radio Canada Intl: "The Mailbag"
1354	Vatican Radio: "On-the-Air"
1400	Kim Elliott via WRN1 (Internet): "Communications World ABC"

Continued on page 104

Frequencies

0000-0100	Anguilla,Caribbean Beacon	6090am			
0000-0100 vl	Australia, ABC/Katherine	5025do			
0000-0100 vl	Australia, ABC/Tent Creek	4910do			
0000-0100	Australia, Radio	9660pa	12080va	15240pa	17580va
		17750as	17795va	21740va	
0000-0100	Bulgaria, Radio	9400na	11700na		
0000-0015	Cambodia, Natl Radio Of	11940as			
0000-0100	Canada, CBC N Quebec Svc	9625do			
0000-0100	Canada, CFRX Toronto	6070do			
0000-0100	Canada, CFVP Calgary	6030do			
0000-0100	Canada, CHNX Halifax	6130do			
0000-0100	Canada, CKZN St John's	6160do			
0000-0100	Canada, CKZU Vancouver	6160do			
0000-0100	Costa Rica,RF Peace Intl	6975am	15050am	21460am	
0000-0027	Czech Rep, R Prague Intl	11615na	13580na		
0000-0100	Ecuador, HCJB	9745na	12015na	21455va	
0000-0030	Egypt, Radio Cairo	9900am			
0000-0100 vl	Guatemala, Radio Cultural	3300do			
0000-0100	Guyana, GBC/Voice of	5950do			
0000-0045	India, All India Radio	7410as	9705as	9950as	11620as
		13625as			
0000-0100	Japan, Radio/NHK	6155eu	6180eu	9665af	11705na
		11815as	13650as		
0000-0100	Kiribati, Radio	9810do			
0000-0100	Liberia,LCN/R Liberia Int	5100do			
0000-0100	Malaysia, Radio	7295do			
0000-0100	Malaysia, RTM Sarawak	7160do			
0000-0100 vl	Malaysia,RTM KotaKinabalu	5980do			
0000-0030	Mexico, Radio Mexico Intl	9705am			
0000-0100	Namibia, NBC	3270af	3289af		
0000-0100	Netherlands, Radio	6165na	9845na		
0000-0100	New Zealand, R NZ Intl	17675va			
0000-0100	North Korea, R Pyongyang	3560am	11845am	13650am	15230am
0000-0100 vl	Papua New Guinea, NBC	9675do			
0000-0100	Philippines, FEBC R Intl	15450as			
0000-0100	Russia, IBC Tamil	9355as			
0000-0100	Singapore,RCorp Singapore	6150do			
0000-0100	Spain, R Exterior Espana	15385na			
0000-0030	Thailand, Radio	9655af	9690af	11905af	
0000-0030	UK, BBC World Service	3915as	7110as	11945as	17615as
0000-0100	UK, BBC World Service	5965as	5970sa	5975am	6175am
	6195as	9410as	9590am	9915sa	11955as
	12095sa	15310as	15360as	17790as	
0000-0100 vl	UK, IBC Tamil	9355va			
0000-0100 a	UK, Merlin Network One	6015eu	7325eu	9720eu	
0000-0100	USA, KAIJ Dallas TX	5810na			
0000-0100	USA, KJES Vado NM	7555na			
0000-0100	USA, KTBN Salt Lk City UT	15590na			
0000-0100 vl	USA, KVOH Los Angeles CA	17625am			
0000-0100	USA, KWHR Naalehu HI	17510as			
0000-0030	USA, Voice of America	7215as	9770as	11760as	15185as
		15290as	17735as	17820as	
0000-0100 twhfa	USA, Voice of America	5995am	6130ca	7405am	9455af
		9775am	11695ca	13740am	
0000-0100	USA, WBCQ Monticello ME	7415na			
0000-0100	USA, WEWN Birmingham AL	5825na	13615na		
0000-0100	USA, WGTG McCaysville GA	5085am	9400am		
0000-0100	USA, WHRA Greenbush ME	7580na			
0000-0100	USA, WHRI Noblesville IN	5745na	7315na		
0000-0100	USA, WINB Red Lion PA	11950am			
0000-0100	USA, WINB Red Lion PA	11950am			
0000-0100	USA, WJCR Upton KY	7490na			
0000-0100	USA, WRMI/R Miami Intl	9955am			
0000-0100	USA, WRNO New Orleans LA	7355na			
0000-0100	USA, WSHB Cypress Crk SC	7535al	9430na	15285ca	
0000-0100	USA, WWCR Nashville TN	3215na	5070na	7435na	13845na
0000-0100	USA, WYFR Okeechobee FL	6085na	9505na		
0000-0030 vl	Vanuatu, Radio	4960do			
0010-0020	Kyrgyzstan, Kyrgyz Radio	4010do	4050do		
0015-0100	Japan, Radio/NHK	6155eu	6180eu	9665af	11705na
0030-0100	Austria, R Austria Intl	9655na	9870na		
0030-0100	Iran, VOIRI	9022am	9795ca	11970na	
0030-0100 vl	Solomon Islands, SIBC	5020do			
0030-0100	Sri Lanka, Sri Lanka BC	6005as	9730as	15425as	
0030-0100	Thailand, Radio	9655as	11905as	15395na	
0050-0100	Italy, RAI Intl	9675na	11800na	15240na	

Selected Programs

Sundays

0000 Australia, Radio: RA News. Five or ten minutes of world, Australian, and regional news.
0000 Ecuador, HCJB Quito (am): Nite Brite Kid's Club. A new series for children about the Exodus.
0000 USA, WINB Red Lion PA: Musical Memories.
0000 USA, WWCR #1 Nashville TN: What Does the Bible Say?. Pastor Dennis Costella of the Fundamental Bible Church of Los Osos, California, exposes false teachings and other religions.
0000 USA, WWCR #3 Nashville TN: Power of Prophecy. Texe Marrs and a guest discuss the evils and pitfalls of today and the outlook for tomorrow.
0010 Australia, Radio: Correspondents' Report. The ABC's foreign correspondents report home with Hamish Robertson.
0030 Australia, Radio: Democracy and Nation. No information available.
0030 Ecuador, HCJB Quito (am): Saludos Amigos. An international friendship program with listener contributions presented by Ken MacHarg.
0030 USA, WINB Red Lion PA: 413 Limited.
0030 USA, WWCR #1 Nashville TN: Life's Railway to Heaven. WT English evangelizes from South Carolina.

Mondays

0000 Australia, Radio: RA News. See S 0000.
0000 Ecuador, HCJB Quito (am): A Firm Foundation. See S 1200.
0000 USA, WINB Red Lion PA: Discoveries in Health.
0000 USA, WWCR #1 Nashville TN: The Jesus Time Network. Walter Bails evangelizes from Gatlinburg, Tennessee.
0000 USA, WWCR #3 Nashville TN: Discoveries in Health (hour 2) (live). The second hour of the health and herbs show from the American Freedom Network.
0005 Ecuador, HCJB Quito (am): Hour of Decision. See S 1205.
0010 Australia, Radio: Correspondents' Report. See S 0010.
0030 Ecuador, HCJB Quito (am): Mountain Meditations. See S 0600.
0030 USA, WWCR #1 Nashville TN: HarvestTime. Gospel music and inspiration from the United Pentecostal Church International.
0045 USA, WWCR #1 Nashville TN: First Hand. Rick Livingood with a world evangelism update.

Tuesday-Saturday

0000 Australia, Radio: RA News. See S 0000.
0000 Ecuador, HCJB Quito (am): Insight for Living. See M 1100.
0000 USA, WINB Red Lion PA: Republic Radio.
0000 USA, WWCR #1 Nashville TN: Newswatch Magazine. See M 1100.
0028 Ecuador, HCJB Quito (am): Money Minute. See M 0200.
0030 Ecuador, HCJB Quito (am): Focus on the Family. Psychologist James Dobson on everyday family matters.
0056 Ecuador, HCJB Quito (am): Beyond the Call. See M 1456.
0057 Ecuador, HCJB Quito (am): Parent Talk Tip. See M 1458.

Tuesdays

0000 USA, WWCR #3 Nashville TN: To Health with You (live). Jeff Bennett.
0010 Australia, Radio: Asia Pacific. See M 1105.
0030 Australia, Radio: The Law Report. Susanna Lobez brings an insider's perspective to the complexities of the law.

Wednesdays

0000 USA, WWCR #3 Nashville TN: Perspectives on America (live). Jeff Bennett of Republic Radio talks about preparedness issues.
0010 Australia, Radio: Asia Pacific. See M 1105.
0030 Australia, Radio: The Religion Report. Hosted by John Cleary.

Thursdays

0000 USA, WWCR #3 Nashville TN: Perspectives on America (live). See W 0000.
0010 Australia, Radio: Asia Pacific. See M 1105.
0030 Australia, Radio: Media Report. Agnes Warren presents the inside story on how the communications industry operates and puts the spotlight on media people and their activities.
0030 BBC London (AS): Assignment. See H 1130.

Fridays
0000 USA, WWCR #3 Nashville TN: Perspectives on America (live). See W 0000.
0010 Australia, Radio: Asia Pacific. See M 1105.
0030 Australia, Radio: The Sports Factor. Amanda Smith hosts the program that debates Australia's sporting culture.

Saturdays

0000 USA, WWCR #3 Nashville TN: American Sovereign (live). Brett Johnson.
0005 Australia, Radio: Asia Pacific. See M 1105.
0030 Australia, Radio: Feedback. See S 0330.

RADIO DATABASE INTERNATIONAL WHITE PAPER® reports contain virtually everything found during exhaustive tests of premium shortwave receivers and outdoor antennas. For a complete list, please send a self-addressed stamped envelope to RDI White Papers, Box 300M, Penn's Park PA 18943 USA; or go to www.passband.com.

Frequencies

0100-0200	Anguilla,Caribbean Beacon	6090am			
0100-0200 vl	Australia, ABC/Katherine	5025do			
0100-0200 vl	Australia, ABC/Tent Creek	4910do			
0100-0200	Australia, Radio	9660pa	12080va	15240pa	15415as
		17580va	17750as	17795va	21740va
0100-0200	Canada, CBC N Quebec Svc	9625do			
0100-0200	Canada, CFRX Toronto	6070do			
0100-0200	Canada, CFVP Calgary	6030do			
0100-0200	Canada, CHNX Halifax	6130do			
0100-0200	Canada, CKZN St John's	6160do			
0100-0200	Canada, CKZU Vancouver	6160do			
0100-0129	Canada, R Canada Intl	5960na	9535am	9755am	11715am
		13670am			
0100-0156	China, China Radio Intl	9570na			
0100-0200	Costa Rica,RF Peace Intl	6975am	15050am	21460am	
0100-0200	Cuba, Radio Havana	6000na	9820na	11705na	13605na
0100-0127	Czech Rep, R Prague Intl	7345na	11615na		
0100-0200	Ecuador, HCJB	9745na	12015na	21455va	
0100-0145	Germany, Deutsche Welle	6040na	9640am	11810na	13720am
0100-0200 s	Germany, Good News World	9855eu			
0100-0130 s	Germany, Universal Life	9495as			
0100-0130 m	Germany, V O Deliverance	9855na			
0100-0200 vl	Guatemala, Radio Cultural	3300do			
0100-0200	Guyana, GBC/Voice of	5950do			
0100-0200	Indonesia, Voice of	9525va			
0100-0130	Iran, VOIRI	9022am	9795ca	11970na	
0100-0110	Italy, RAI Intl	9675na	11800na	15240na	
0100-0200	Japan, Radio/NHK	9660me	11860as	11870me	15570as
		15590as	17685pa	17835sa	21670pa
0100-0200	Kenya, Kenya BC Corp	4885do			
0100-0130	Kiribati, Radio	9810do			
0100-0200	Liberia,LCN/R Liberia Int	5100do			
0100-0200	Malaysia, Radio	7295do			
0100-0200 vl	Malaysia,RTM KotaKinabalu	5980do			
0100-0200	Namibia, NBC	3270af	3289af		
0100-0125	Netherlands, Radio	6165na	9845na		
0100-0200	New Zealand, R NZ Intl	17675va			
0100-0200 vl	Papua New Guinea, NBC	9675do			
0100-0200	Philippines, FEBC R Intl	15450as			
0100-0130	Serbia, Radio Yugoslavia	9580eu	11850eu		
0100-0200	Singapore,RCorp Singapore	6150do			
0100-0130	Slovakia, R Slovakia Intl	5930na	7300ca	9440sa	
0100-0200 vl	Solomon Islands, SIBC	5020do			
0100-0200	Spain, R Exterior Espana	15385na			
0100-0200	Sri Lanka, Sri Lanka BC	6005as	9730as	15425as	
0100-0130	Switzerland, Swiss R Intl	9885am	9905am		
0100-0200	UK, BBC World Service	5970sa	5975am	6175am	6185am
	6195as	9410as	9590am	9915sa	11955as
	12095sa	15280as	15310as	15360as	17790as
0100-0200	Ukraine, R Ukraine Intl	5905eu	6020eu	6090eu	
0100-0200	USA, KAIJ Dallas TX	5810na			
0100-0200	USA, KJES Vado NM	7555na			
0100-0200	USA, KTBN Salt Lk City UT	7510na			
0100-0200	USA, KWHR Naalehu HI	17510as			
0100-0200	USA, Voice of America	7115as	7200as	9635as	11705as
	11725as	11820as	15250as	17740as	17820as
0100-0130 twhfa	USA, Voice of America	5995am	6130am	7405am	9455af
		9775am	13740am		
0100-0200	USA, WBCQ Monticello ME	7415na			
0100-0200	USA, WEWN Birmingham AL	5825na	13615na		
0100-0200	USA, WGTG McCaysville GA	5085am	6890am		
0100-0200	USA, WHRA Greenbush ME	7580na			
0100-0200	USA, WHRI Noblesville IN	5745na	7315na		
0100-0200	USA, WINB Red Lion PA	11950am			
0100-0200	USA, WJCR Upton KY	7490na			
0100-0200	USA, WRMI/R Miami Intl	9955am			
0100-0200	USA, WRNO New Orleans LA	7355na			
0100-0200	USA, WSHB Cypress Crk SC	7535al	9430na	15285ca	
0100-0200	USA, WWCR Nashville TN	3215na	5070na	5935na	7435na
0100-0200	USA, WYFR Okeechobee FL	6065na	9505na		
0100-0130	Uzbekistan, R Tashkent	7190as	9375as	9530as	9715as
0100-0127	Vietnam, Voice of	7250va			
0115-0145 vl	Libya, Voice of Africa	15235va	15415va	15435va	
0129-0200	Canada, R Canada Intl	5960na	9755am		
0129-0200 sm	Canada, R Canada Intl	9535am	11715am	13670am	
0130-0200	Lithuania, Radio Vilnius	9855am			
0130-0200	Slovakia, AWR Europe	11660as			
0130-0200	Sweden, Radio	13625as			
0130-0200	UK, RTE Radio	6155eu			
0130-0200 twhfa	USA, Voice of America	5995am	6130am	9455af	
0140-0200	Vatican City, Vatican R	9650au	12055au		
0145-0200	Albania, R Tirana Intl	6115na	6120al	7160na	

Selected Programs

Sundays

0100 Australia, Radio: RA News. See S 0000.
0100 Ecuador, HCJB Quito (am): Latin and International News. Ten minutes of regional and world news.
0100 USA, WINB Red Lion PA: Down Home Gospel.
0100 USA, WWCR #1 Nashville TN: Faith Holiness Church. Larry Cain evangelizes from South Carolina.
0100 USA, WWCR #3 Nashville TN: Tomorrow's News Today. George Hyatt is not the presenter, he's the evangelist.
0105 Australia, Radio: The Europeans. Maria Zijlstra presents reports and features on aspects of European politics, culture and society.
0110 Ecuador, HCJB Quito (am): DX Partyline. Allen Graham gives you plenty of information to help you get more fun out of shortwave listening.
0130 USA, WINB Red Lion PA: A Look into the Word.
0130 USA, WWCR #1 Nashville TN: The Lights of Spiritual Guidance. Gospel and song with J. Harold Lowman.
0130 USA, WWCR #3 Nashville TN: Dixie Rising. Dan Meredith wants the South to rise again.

Mondays

0100 Australia, Radio: RA News. See S 0000.
0100 Ecuador, HCJB Quito (am): Latin and International News. See S 0100.
0100 USA, WINB Red Lion PA: Life Quest.
0100 USA, WWCR #1 Nashville TN: Christ Kingdom Ministries. William Smith.
0110 Australia, Radio: Awaye!. Lorena Allam hosts a program of indigenous arts and issues.
0110 Ecuador, HCJB Quito (am): Musical Mailbag. HCJB staffers have a good time reading listener letters and playing music.
0115 USA, WINB Red Lion PA: Reality in Jesus.
0130 USA, WINB Red Lion PA: Musical Memories.
0130 USA, WWCR #1 Nashville TN: Alternative Health Care 101. Grant Gerondale.
0145 USA, WWCR #1 Nashville TN: The Last Day Message. Rick Long's message is garnished with fire and brimstone.

Tuesday-Saturday

0100 Australia, Radio: RA News. See S 0000.
0100 Ecuador, HCJB Quito (am): News. A summary of world and regional news.
0100 USA, WWCR #3 Nashville TN: The Stan Solomon Show (live). A conservative, no-holds-barred commentary on American life that challenges people to become involved in the country's direction.
0110 Ecuador, HCJB Quito (am): Studio 9. Jeff Ingram is your tour director on your daily travel and adventure guide to life in Latin America.

Tuesdays

0100 USA, WINB Red Lion PA: Voice of Evangelism.
0100 USA, WWCR #1 Nashville TN: USA Radio News. See S 0400.
0110 Australia, Radio: Science Show. Robyn Williams presents the world of science, both at home and abroad.
0130 Ecuador, HCJB Quito (am): Adventures in Odyssey. Lively childrens' dramas from the "Focus on the Family" team.

Wednesdays

0100 USA, WINB Red Lion PA: Voice of Evangelism.
0100 USA, WWCR #1 Nashville TN: USA Radio News. See S 0400.
0110 Australia, Radio: The National Interest. See S 1605.
0130 Ecuador, HCJB Quito (am): El Mundo Futuro. Allen Graham with the world of science and technology and a "Computer Corner" segment.

Thursdays

0100 USA, WINB Red Lion PA: Alternative Health Care.
0100 USA, WWCR #1 Nashville TN: USA Radio News. See S 0400.
0110 Australia, Radio: Background Briefing. Australia's top award-winning current affairs program.
0115 USA, WINB Red Lion PA: The Sower.
0130 Ecuador, HCJB Quito (am): Ham Radio Today. John Beck with features, tips, news, and helps for radio amateurs.
0130 USA, WINB Red Lion PA: Cross Beams.

Fridays

0100 USA, WINB Red Lion PA: Alternative Health Care.
0100 USA, WWCR #1 Nashville TN: USA Radio News. See S 0400.
0110 Australia, Radio: Hindsight. See H 1605.
0130 Ecuador, HCJB Quito (am): Woman to Woman. Focus on topics of concern with Phyllis Wallace.
0130 USA, WINB Red Lion PA: Down Home Gospel.

Saturdays

0100 USA, WINB Red Lion PA: Voice in the Wilderness.
0100 USA, WWCR #1 Nashville TN: American Sovereign (live). See A 0000.
0105 Australia, Radio: Oz Sounds. See S 0430.
0130 Australia, Radio: Arts Talk. See W 2330.
0130 Ecuador, HCJB Quito (am): Musica del Ecuador. Jorge Zambrano presents a unique mix of Ecuadorian music and friendly chatter (highly rated).

Frequencies

0200-0300	Anguilla,Caribbean Beacon	6090am			
0200-0300 twhfa	Argentina, RAE	11710am			
0200-0300 vl	Australia, ABC/Katherine	5025do			
0200-0300 vl	Australia, ABC/Tent Creek	4910do			
0200-0300	Australia, Radio	9660pa	12080va	15240pa	15415as
		15515va	17580va	17750as	21725pa
0200-0210	Bangladesh, Bangla Betar	4880as			
0200-0300	Canada, CBC N Quebec Svc	9625do			
0200-0300	Canada, CFRX Toronto	6070do			
0200-0300	Canada, CFVP Calgary	6030do			
0200-0300	Canada, CHNX Halifax	6130do			
0200-0300	Canada, CKZN St John's	6160do			
0200-0300	Canada, CKZU Vancouver	6160do			
0200-0229	Canada, R Canada Intl	9535am	9755am	11715am	13670am
		15305am			
0200-0300	Costa Rica,RF Peace Intl	6975am	15050am	21460am	
0200-0300	Cuba, Radio Havana	6000na	9820na	11705na	13605na
0200-0300	Ecuador, HCJB	9745na	12015na	21455va	
0200-0300	Egypt, Radio Cairo	9475na			
0200-0245	Germany, Deutsche Welle	9615as	9690as	11945as	11965as
		13690as	15560as		
0200-0300	Guyana, GBC/Voice of	5950do			
0200-0230	Hungary, Radio Budapest	9560na			
0200-0300	Kenya, Kenya BC Corp	4935do			
0200-0300	Malaysia, Radio	7295do			
0200-0230	Myanmar, Radio	7185do			
0200-0300	Namibia, NBC	3270af	3289af		
0200-0300	New Zealand, R NZ Intl	17675va			
0200-0300 vl	Papua New Guinea, NBC	9675do			
0200-0256	Romania, R Romania Intl	9510na	9570na	11725au	11740na
		11810as	17735as		
0200-0300	Russia,Voice of Russia WS	7180na	12050na	15520na	15595na
0200-0300	Singapore,RCorp Singapore	6150do			
0200-0300 vl	Solomon Islands, SIBC	5020do			
0200-0300	South Korea, R Korea Intl	7275as	11725sa	11810sa	15575na
0200-0300	Sri Lanka, Sri Lanka BC	6005as	9730as	15425as	
0200-0300	Taiwan, Radio Taipei Intl	5950na	9680na	11740na	11745va
		11825pa	15345as		
0200-0300	UK, BBC World Service	5970sa	5975am	6175am	6185am
	6195eu	9410me	9770af	9915sa	11955as
	15280as	15310as	15360as	17790as	
0200-0300	USA, KAIJ Dallas TX	5810na			
0200-0230	USA, KJES Vado NM	7555na			
0200-0300	USA, KTBN Salt Lk City UT	7510na			
0200-0300 vl	USA, KVOH Los Angeles CA	9975am			
0200-0300	USA, KWHR Naalehu HI	17510as			
0200-0300	USA, Voice of America	4960af	7115as	7200as	9635as
	11705as 11725as	11820as	15250as	17740as	17820as
0200-0300	USA, WBCQ Monticello ME	7415na			
0200-0300	USA, WEWN Birmingham AL	5825va			
0200-0300	USA, WGTG McCaysville GA	5085am	6890am		
0200-0300	USA, WHRA Greenbush ME	7580na			
0200-0300	USA, WHRI Noblesville IN	5745na	7315sa		
0200-0300	USA, WINB Red Lion PA	11950am			
0200-0300	USA, WJCR Upton KY	7490na			
0200-0300	USA, WRMI/R Miami Intl	9955am			
0200-0300	USA, WRNO New Orleans LA	7355na			
0200-0300	USA, WSHB Cypress Crk SC	5850al	7535na	9430na	
0200-0300	USA, WWCR Nashville TN	3215na	5070na	5935na	7435na
0200-0300	USA, WYFR Okeechobee FL	6065na	9505na		
0205-0220	Croatia, Croatian Radio	9925sa			
0215-0220	Nepal, Radio	5005as	7165as		
0229-0300 sm	Canada, R Canada Intl	9535am	9755am	11715am	13670am
0230-0300	Albania, R Tirana Intl	6115na	6120al	7160na	
0230-0300	Austria, R Austria Intl	9655na	9870ca	13730na	
0230-0245	Pakistan, Radio	9640as	11930as	15455as	15485as
		17660as	17895as		
0230-0300 vl	Philippines, R Pilipinas	11885as	15120as	15270as	
0230-0300	Sweden, Radio	9495na			
0230-0257	Vietnam, Voice of	7250va			
0250-0300	Vatican City, Vatican R	7305am	9605am		

Selected Programs

Sundays

0200 Australia, Radio: RA News. See S 0000.
0200 Ecuador, HCJB Quito (am): Rock Solid!. Elaine Childs with a one-hour program of contemporary (rock) Christian music.
0200 USA, WINB Red Lion PA: A New and Living Way.
0200 USA, WWCR #1 Nashville TN: Open Bible Dialogue. Joseph Chambers preaches Bible prophecy from North Carolina.
0200 USA, WWCR #3 Nashville TN: Communications World ABC. A look at the people, technologies, economics, and politics involved in modern telecommunications.
0210 Australia, Radio: Fine Music Australia. The best Australian fine music performances and compositions are presented by Ivan Lloyd.
0230 Australia, Radio: Innovations. Desley Blanch reports on Australian inventions and innovative practices.
0230 USA, WINB Red Lion PA: Voice in the Wilderness.
0230 USA, WWCR #3 Nashville TN: World of Radio. Glenn Hauser's communications program for shortwave radio listeners.

Mondays

0200 Australia, Radio: RA News. See S 0000.
0200 Ecuador, HCJB Quito (am): Sunday Nite. New program - no information available.
0200 USA, WINB Red Lion PA: Cells of Christ.
0200 USA, WWCR #1 Nashville TN: Power of Prophecy. See S 0000.
0200 USA, WWCR #3 Nashville TN: Mike Jarmus Program (hour 1) (live). Mike, his guests, and callers discuss UFOs and other far out topics.
0210 Australia, Radio: The World Today. Tony Eastley with current affairs updates.
0230 USA, WINB Red Lion PA: In God We Trust.
0230 UK, BBC London (AF): Paul McCartney's Routes of Rock (1st). See W 0530.

Tuesday-Saturday

0200 Australia, Radio: RA News. See S 0000.
0200 USA, WWCR #3 Nashville TN: The Stan Solomon Show (live). See T 0100.

Tuesdays

0200 Ecuador, HCJB Quito (am): Simply Worship. See S 1400.
0200 USA, WINB Red Lion PA: Alternative Health Care.
0200 USA, WWCR #1 Nashville TN: The Sweet Liberty (live). Jackie Patru.
0210 Australia, Radio: The World Today. See M 0210.
0215 USA, WINB Red Lion PA: Life Quest.
0230 Ecuador, HCJB Quito (am): Let My People Think. Addressing questions of today's thinking Christians.
0230 USA, WINB Red Lion PA: Divine Plan.

Wednesdays

0200 Ecuador, HCJB Quito (am): The Book and the Spade. Gordon Govier examines the quest for biblical knowledge through archaeology.
0200 USA, WINB Red Lion PA: Day of Decision.
0200 USA, WWCR #1 Nashville TN: The Sweet Liberty (live). See T 0200.
0210 Australia, Radio: The World Today. See M 0210.
0215 Ecuador, HCJB Quito (am): Words for Women. Helpful ideas for family living with Ardy Iwena.
0230 Ecuador, HCJB Quito (am): Unshackled. Pacific Garden Mission's radio drama.
0230 USA, WINB Red Lion PA: A Look into the word.

Thursdays

0200 Ecuador, HCJB Quito (am): Rock Solid!. See S 0200.
0200 USA, WINB Red Lion PA: Staff of Life Ministries.
0200 USA, WWCR #1 Nashville TN: The Sweet Liberty (live). See T 0200.
0210 Australia, Radio: The World Today. See M 0210.
0215 USA, WINB Red Lion PA: Reality in Jesus.
0230 USA, WINB Red Lion PA: Thru the Bible.
0230 UK, BBC London (AS): Paul McCartney's Routes of Rock (4th,11th). See W 0530.

Fridays

0200 Ecuador, HCJB Quito (am): Viewpoint. Music and messages of inspiration from the radio ministry of Church of God.
0200 USA, WWCR #1 Nashville TN: The Sweet Liberty (live). See T 0200.
0210 Australia, Radio: The World Today. See M 0210.
0230 Ecuador, HCJB Quito (am): Inspirational Classics. Scott and Judy Gillen of New Zealand with a program of sacred classical music.
0230 USA, WINB Red Lion PA: Focus on the Kingdom.
0230 USA, WINB Red Lion PA: Thru the Bible.
0244 USA, WINB Red Lion PA: Staff of Life Ministries.

Saturdays

0200 Ecuador, HCJB Quito (am): Inside HCJB. Paul Bell gives you a inside look at the Voice of the Andes.
0200 USA, WINB Red Lion PA: The Wesleyan Hour.
0200 USA, WWCR #1 Nashville TN: The Survival Report (live). Robert Henry offers mail order products from his Florida operation.
0205 Australia, Radio: Ockham's Razor. See S 0405.
0230 Australia, Radio: Earthbeat. See M 2330.
0230 Ecuador, HCJB Quito (am): Walkin' in the Sunshine. Ben Cummings serves as your host for this
0230 USA, WINB Red Lion PA: Good News Hour.

Frequencies

0300-0400	Anguilla,Caribbean Beacon	6090am			
0300-0400 vl	Australia, ABC/Katherine	5025do			
0300-0400 vl	Australia, ABC/Tent Creek	4910do			
0300-0400	Australia, Radio	9660pa	12080as	15240pa	15415as
		15515va	17580va	17750as	21725pa
0300-0330 smwfa	Belarus, R Minsk	7210eu	11670eu		
0300-0400 vl	Botswana, Radio	4820do	7255do		
0300-0400	Bulgaria, Radio	9400na	11700na		
0300-0400	Canada, CBC N Quebec Svc	9625do			
0300-0400	Canada, CFRX Toronto	6070do			
0300-0400	Canada, CFVP Calgary	6030do			
0300-0400	Canada, CHNX Halifax	6130do			
0300-0400	Canada, CKZN St John's	6160do			
0300-0400	Canada, CKZU Vancouver	6160do			
0300-0356	China, China Radio Intl	9690na	11765na		
0300-0400	Costa Rica,RF Peace Intl	6975am	15050am		
0300-0305 vl	Croatia, Croatian Radio	9925na			
0300-0400	Cuba, Radio Havana	6000na	9820na	11705na	13605na
0300-0327	Czech Rep, R Prague Intl	7345na	9955na	11615na	
0300-0400	Ecuador, HCJB	9745na	12015na	21455va	
0300-0330	Egypt, Radio Cairo	9475am			
0300-0345	Germany, Deutsche Welle	9535na	9640na	11810na	13780am
		15105na			
0300-0310	Greece, Voice of	7450na	9420na	11645na	12105na
0300-0400 vl	Guatemala, Radio Cultural	3300do			
0300-0400	Guyana, GBC/Voice of	5950do			
0300-0400	Japan, Radio/NHK	17825ca	21610pa		
0300-0400	Kenya, Kenya BC Corp	4885do	4935do		
0300-0400 vl	Lesotho, Radio	4800do			
0300-0400	Malaysia, Radio	7295do			
0300-0325	Moldova, R Moldova Intl	7520am			
0300-0400	Namibia, NBC	3270af	3289af		
0300-0400	New Zealand, R NZ Intl	17675va			
0300-0330	Pakistan, Radio	6070do			
0300-0400 vl	Papua New Guinea, NBC	9675do			
0300-0330 vl	Philippines, R Pilipinas	11885as	15120as	15270as	
0300-0400	Russia,Voice of Russia WS	7180na	9665na	12020na	15520na
		15595na			
0300-0330	S Africa, AWR Africa	6015af			
0300-0330	S Africa, Channel Africa	6035af			
0300-0400	Singapore,RCorp Singapore	6150do			
0300-0400	Sri Lanka, Sri Lanka BC	6005as	9730as	15425as	
0300-0400	Taiwan, Radio Taipei Intl	5950na	9680na	11745as	11825as
		15345as			
0300-0330	Thailand, Radio	9655am	11905am	15395na	
0300-0400	Uganda, Radio	4976do			
0300-0400	UK, BBC World Service	3255af	5975am	6005af	6175am
	6185am	6190af	7160af	9410eu	11760me
	11765af	11955as	12095af	15280as	15310as
	15420af	17760as	17790as	21660as	
0300-0400	USA, KAIJ Dallas TX	5810na			
0300-0400	USA, KTBN Salt Lk City UT	7510na			
0300-0400 vl	USA, KVOH Los Angeles CA	9975am			
0300-0400	USA, KWHR Naalehu HI	17510as			
0300-0330 smtwh	USA, Voice of America	4960af			
0300-0400	USA, Voice of America	6080af	6115af	7105af	7275af
		7290af	9575af	9885af	
0300-0400	USA, WBCQ Monticello ME	7415na			
0300-0400	USA, WEWN Birmingham AL	5825va			
0300-0400	USA, WGTG McCaysville GA	5085am	6890am		
0300-0400	USA, WHRA Greenbush ME	7580na			
0300-0400	USA, WHRI Noblesville IN	5745na	7315sa		
0300-0400	USA, WINB Red Lion PA	11950am			
0300-0400	USA, WJCR Upton KY	7490na			
0300-0330	USA, WRMI/R Miami Intl	7465am			
0300-0400	USA, WRNO New Orleans LA	7395na			
0300-0400	USA, WWCR Nashville TN	3215na	5070na	5935na	7435na
0300-0400	USA, WYFR Okeechobee FL	6065na	9505na		
0300-0310	Vatican City, Vatican R	7305am	9605am		
0300-0400	Zambia, Natl BC Corp	6165do	6265do		
0300-0400 vl	Zimbabwe, Zimbabwe BC	3306do	4828do		
0305-0320 mtwhfa	UK, BBC World Service	15360as			
0310-0315 thfa/vl	Kyrgyzstan, Kyrgyz Radio	4010do	4050do		
0310-0340	Vatican City, Vatican R	9660af			
0330-0357	Czech Rep, R Prague Intl	11600as	15530as		
0330-0400	Hungary, Radio Budapest	9840na			
0330-0350 vl	Libya, Voice of Africa	15235va	15415va	15435va	
0330-0400 vl	Philippines, R Pilipinas	13770as	15330as	17730as	
0330-0400	Sweden, Radio	9495na	12060na		
0330-0400	Tanzania, Radio	5050af			
0330-0400	UAE, Radio Dubai	12005na	13675na	15400na	
0330-0400	USA, WRMI/R Miami Intl	7465am			
0330-0357	Vietnam, Voice of	9830va			
0359-0400	Zambia, Christian Voice	6065do			

Selected Programs

Sundays

0300 Australia, Radio: RA News. See S 0000.
0300 Ecuador, HCJB Quito (am): Alive!. Ron Hutchcraft.
0300 USA, WWCR #1 Nashville TN: Watch America. John Pinkston of The Congregation of God Seventh Day with up-to-the-minute Biblical insights on world news and prophetic events.
0300 USA, WWCR #3 Nashville TN: Spectrum (live). SWLs and Hams call Mark Emanuele with technical questions and comments.
0305 Australia, Radio: Correspondents' Report. See S 0010.
0330 Australia, Radio: Feedback. Roger Broadbent answers letters and discusses new programs, reception problems, and questions about Australia.
0330 USA, WWCR #1 Nashville TN: Banner of Truth. Cornelius (Neil) Pronk is the radio pastor.
0345 USA, WINB Red Lion PA: Life Quest.
0345 USA, WWCR #1 Nashville TN: A Study in God's Word. From North Carolina, Hezakiah Smith reads Scripture.

Mondays

0300 Australia, Radio: RA News. See S 0000.
0300 Ecuador, HCJB Quito (am): The Sower. Michael Guido presents music and inspiration.
0300 USA, WWCR #1 Nashville TN: Christ Kingdom Ministries. See M 0100.
0300 USA, WWCR #3 Nashville TN: Mike Jarmus Program (hour 2) (live). See M 0200.
0310 Australia, Radio: The Margaret Throsby Interview. See S 0030.
0315 Ecuador, HCJB Quito (am): The Word Today. A discussion of Biblical themes.
0330 Ecuador, HCJB Quito (am): Radio Reading Room. Readings from new Christian books.
0330 USA, WINB Red Lion PA: Day of Decision.
0330 USA, WWCR #1 Nashville TN: Leaves from the Tree of Life. Robert McClintock.

Tuesday-Saturday

0300 Australia, Radio: RA News. See S 0000.
0300 Ecuador, HCJB Quito (am): Hope for the Heart. June Hunt present's God's principles for today's marriage.
0300 USA, WINB Red Lion PA: Republic Radio.
0300 USA, WWCR #1 Nashville TN: Prophet 3H. Jeffrey McLain.
0315 Ecuador, HCJB Quito (am): Rendezvous. Dick Saunders presents Bible study and evangelism.

Tuesdays

0300 USA, WWCR #3 Nashville TN: Scriptures for America (live). See M 1603.
0310 Australia, Radio: The Margaret Throsby Interview. See S 0030.
0313 Ecuador, HCJB Quito (am): Getting the Message. See M 1313.
0330 Ecuador, HCJB Quito (am): MasterControl. A magazine program of current topics, lifestyle issues, and Christian themes.
0330 USA, WWCR #1 Nashville TN: The Prophecy Club. Stan Johnson discusses bible prophecy from Topeka, Kansas.

Wednesdays

0300 USA, WWCR #3 Nashville TN: Scriptures for America (live). See M 1603.
0310 Australia, Radio: The Margaret Throsby Interview. See S 0030.
0313 Ecuador, HCJB Quito (am): Getting the Message. See M 1313.
0330 Ecuador, HCJB Quito (am): CBF Presents. Christian activities in the Caribbean.
0330 USA, WWCR #1 Nashville TN: The Prophecy Club. See T 0330.
0345 Ecuador, HCJB Quito (am): Wonderful Words of Life. The international ministry of the Salvation Army.

Thursdays

0300 USA, WWCR #3 Nashville TN: Scriptures for America (live). See M 1603.
0310 Australia, Radio: The Margaret Throsby Interview. See S 0030.
0313 Ecuador, HCJB Quito (am): Getting the Message. See M 1313.
0330 Ecuador, HCJB Quito (am): The Living Word. See S 1130.
0330 USA, WWCR #1 Nashville TN: The Prophecy Club. See T 0330.

Fridays

0300 USA, WWCR #3 Nashville TN: Scriptures for America (live). See M 1603.
0310 Australia, Radio: The Margaret Throsby Interview. See S 0030.
0313 Ecuador, HCJB Quito (am): Getting the Message. See M 1313.
0330 Ecuador, HCJB Quito (am): Radio Reading Room. See M 0330.
0330 USA, WWCR #1 Nashville TN: The Prophecy Club. See T 0330.

Saturdays

0300 USA, WWCR #3 Nashville TN: Health Programming (live). See F 1603.
0305 Australia, Radio: Rural Reporter. See S 0030.
0313 Ecuador, HCJB Quito (am): Getting the Message. See M 1313.
0330 Australia, Radio: Lingua Franca. Words and their stories.
0330 Ecuador, HCJB Quito (am): On Track. Dave Tucker with good comtemporary music and helpful thoughts.
0330 USA, WWCR #1 Nashville TN: The Prophecy Club. See T 0330.
0345 Australia, Radio: Book Reading. Serialized readings of the best Australian novels.

Frequencies

0400-0500	Anguilla,Caribbean Beacon	6090am			
0400-0430	Armenia, Voice of	4810va			
0400-0500 vl	Australia, ABC/Katherine	5025do			
0400-0500 vl	Australia, ABC/Tent Creek	4910do			
0400-0500	Australia, Radio	9660pa	12080va	15240pa	15415as
		15515va	17580va	17750as	21725pa
0400-0500 vl	Botswana, Radio	4820do	7255do		
0400-0500	Canada, CBC N Quebec Svc	9625do			
0400-0500	Canada, CFRX Toronto	6070do			
0400-0500	Canada, CFVP Calgary	6030do			
0400-0500	Canada, CHNX Halifax	6130do			
0400-0500	Canada, CKZN St John's	6160do			
0400-0500	Canada, CKZU Vancouver	6160do			
0400-0430	Canada, R Canada Intl	11835me	11975me	15215me	
0400-0457	China, China Radio Intl	9560na	9730na		
0400-0500	Costa Rica,RF Peace Intl	6975am	15050am		
0400-0500	Cuba, Radio Havana	6000na	9820na	11705na	13605na
0400-0500	Ecuador, HCJB	9745na	12015na	21455va	
0400-0445	Germany, Deutsche Welle	7225af	9565af	9765af	11785af
		13690af			
0400-0500	Germany,Overcomer Ministr	9425na			
0400-0500	Guyana, GBC/Voice of	5950do			
0400-0500	Kenya, Kenya BC Corp	4885do	4935do		
0400-0500 vl	Lesotho, Radio	4800do			
0400-0410 vl/m-f	Malawi, MBC	5993do			
0400-0500	Malaysia, Radio	7295do			
0400-0430 stwhfa	Mexico, Radio Mexico Intl	9705am			
0400-0425	Moldova, R Moldova Intl	7520am			
0400-0500	Namibia, NBC	3270af	3289af		
0400-0500	New Zealand, R NZ Intl	17675va			
0400-0500 vl	Papua New Guinea, NBC	9675do			
0400-0456	Romania, R Romania Intl	9570na	11740na	11810as	17735as
0400-0500	Russia,Voice of Russia WS	7125na	7180na	9665na	12050na
		15425na	15455na	15465na	15495na	15595na
		17565na	17630na	17660na	17690na	
0400-0430	S Africa, Channel Africa	5955af			
0400-0500	Singapore,RCorp Singapore	6150do			
0400-0430	Sri Lanka, Sri Lanka BC	6005as	9730as	15425as	
0400-0430	Switzerland, Swiss R Intl	9885am	9905am		
0400-0430	Tanzania, Radio	5050af			
0400-0500	Turkey, Voice of	7270va	11655va	21715va	
0400-0500	Uganda, Radio	4976do			
0400-0500	UK, BBC World Service	3255af	3955eu	5975am	6005af
	6175am 6185am	6190af	6195eu	7160af	9410eu
	11760me 11765af	11955as	15280as	15310as	15420af
	15575as 17640as	17760as	17790as	21660as	
0400-0500	Ukraine, R Ukraine Intl	6020eu	9620na		
0400-0500	USA, KAIJ Dallas TX	5810na			
0400-0500	USA, KTBN Salt Lk City UT	7510na			
0400-0500 vl	USA, KVOH Los Angeles CA	9975am			
0400-0500	USA, KWHR Naalehu HI	17780as			
0400-0500	USA, Voice of America	6080af	7170va	7265af	7275af
	7290af	9575af	9885af	11965me	15205va
0400-0500	USA, WBCQ Monticello ME	7415na			
0400-0500	USA, WEWN Birmingham AL	5825va			
0400-0500	USA, WGTG McCaysville GA	5085am	6890am		
0400-0500	USA, WHRA Greenbush ME	7580na			
0400-0500	USA, WHRI Noblesville IN	5745na	7315sa		
0400-0500	USA, WINB Red Lion PA	11950am			
0400-0500	USA, WJCR Upton KY	7490na			
0400-0500 stwhfa	USA, WRMI/R Miami Intl	7465am			
0400-0500 m	USA, WRMI/R Miami Intl	9955am			
0400-0500	USA, WRNO New Orleans LA	7395na			
0400-0500	USA, WSHB Cypress Crk SC	7535eu	15195af		
0400-0500	USA, WWCR Nashville TN	3215na	5070na	5935na	7435na
0400-0445	USA, WYFR Okeechobee FL	6065na	9505na		
0400-0500	USA, WYFR Okeechobee FL	9985eu			
0400-0500	Zambia, Christian Voice	6065do			
0400-0500	Zambia, Natl BC Corp	6165do	6265do		
0400-0500 vl	Zimbabwe, Zimbabwe BC	3306do	4828do		
0405-0420	Croatia, Croatian Radio	9925na			
0415-0440	Italy, RAI Intl	5975af	7150af		
0430-0500	Austria, R Austria Intl	6015am	6155na	13730na	
0430-0500	Netherlands, Radio	6165na	9590na		
0430-0500 vl	Nigeria, Radio/Ibadan	6050do			
0430-0500 vl	Nigeria, Radio/Kaduna	4770do			
0430-0500	Nigeria, Radio/Lagos	3326do			
0430-0500	Swaziland, Trans World R	3200af	4775af		
0430-0500	Switzerland, Swiss R Intl	9885am	9905am		
0455-0500	Malaysia, Voice of	6175as	9750as	15295as	
0455-0500	Nigeria, Voice of	7255af	15120va		

Selected Programs

Sundays

0400 Australia, Radio: RA News. See S 0000.
0400 Ecuador, HCJB Quito (am): Latin and International News. See S 0100.
0400 USA, WINB Red Lion PA: Happy Half Hour of Heaven.
0400 USA, WWCR #1 Nashville TN: USA Radio News. News summary from the USA Radio News Network.
0400 USA, WWCR #3 Nashville TN: USA Radio News. See S 0400.
0405 Australia, Radio: Ockham's Razor. Robyn Williams with straight, sharp talk about science.
0405 USA, WWCR #1 Nashville TN: The Bible's Greatest Heroes. Sound tracks from animated Bible stories.
0405 USA, WWCR #3 Nashville TN: The Right Perspective (live). Hal, Frank and John.
0410 Ecuador, HCJB Quito (am): DX Partyline. See S 0110.
0430 Australia, Radio: Oz Sounds. Thirty minutes of music selections by Radio Australia announcers.
0430 USA, WINB Red Lion PA: Reality in Jesus.

Mondays

0400 Australia, Radio: RA News. See S 0000.
0400 Ecuador, HCJB Quito (am): Latin and International News. See S 0100.
0400 USA, WINB Red Lion PA: Battle Cry Sounding.
0400 USA, WWCR #1 Nashville TN: Truth Shall Make You Free. Otis Bonds.
0400 USA, WWCR #3 Nashville TN: Watch America. See S 0300.
0410 Australia, Radio: The World Today (repeat). See M 0210.
0410 Ecuador, HCJB Quito (am): Musical Mailbag. See M 0110.
0430 USA, WWCR #1 Nashville TN: Lyon Gold and Silver Magnet Program (repeat). Lew Lyon hawks a variety of products for healing.
0430 USA, WWCR #3 Nashville TN: Ask WWCR. A mailbag program that answers listener questions about the business of shortwave and radio propagation.
0445 USA, WWCR #3 Nashville TN: Eco Watch. See S 2315.

Tuesday-Saturday

0400 Australia, Radio: RA News. See S 0000.
0400 Ecuador, HCJB Quito (am): News. See T 0100.
0400 USA, WINB Red Lion PA: Republic Radio.
0400 USA, WWCR #1 Nashville TN: USA Radio News. See S 0400.
0400 USA, WWCR #3 Nashville TN: Lyon Gold and Silver Magnet Program (live). See M 0430.
0405 USA, WWCR #1 Nashville TN: The Overcomer Broadcast. See M 1200.
0410 Australia, Radio: The World Today (repeat). See M 0210.
0410 Ecuador, HCJB Quito (am): Studio 9. See T 0110.

Tuesdays

0430 Ecuador, HCJB Quito (am): Adventures in Odyssey. See T 0130.

Wednesdays

0430 Ecuador, HCJB Quito (am): El Mundo Futuro. See W 0130.
0458 Ecuador, HCJB Quito (am): Parent Talk Tip. See M 1458.

Thursdays

0410 Ecuador, HCJB Quito (am): Studio 9. See T 0110.
0430 Ecuador, HCJB Quito (am): Ham Radio Today. See H 0130.

Fridays

0410 Ecuador, HCJB Quito (am): Studio 9. See T 0110.
0430 Ecuador, HCJB Quito (am): Woman to Woman. See F 0130.

Saturdays

0430 Australia, Radio: Jazz Notes. See S 1105.
0430 Ecuador, HCJB Quito (am): Musica del Ecuador. See A 0130.

Hauser's Highlights

ECUADOR: HCJB

B-99 plans English:

UT	kHz	kW	Deg	Target
0000-0400	9745	100	351	N. Amer.(E)
0000-1630	21455	1	35/225	Eur./S.Pac.
0000-0700	12015	50	330	N.America
0400-0700	9745	100	325	N. Amer. (W)
0700-0900	9800	250	34	Europe
0700-1100	11755	100	228	S.Pacific
1100-1630	12005	50	43	Caribbean
1100-1630	15115	100	160/353	N/ SAmerica
1900-2100	17660	100	41	Europe
1900-2200	21455	1	35/225	Eur./S.Pac.
2100-2200	15300	100	41	Europe

(Horst Rosiak, HCJB via Wolfgang Büschel)

Frequencies

0500-0600	Anguilla,Caribbean Beacon	6090am			
0500-0600 vl	Australia, ABC/Katherine	5025do			
0500-0600 vl	Australia, ABC/Tent Creek	4910do			
0500-0600	Australia, Radio	9660pa	12080va	15240pa	15515va
		17580va	21725pa		
0500-0600 as	Australia, Radio	17750as			
0500-0526	Belgium,R Vlaanderen Intl	11840na	15565na		
0500-0600 vl	Botswana, Radio	4820do	7255do		
0500-0600	Canada, CBC N Quebec Svc	9625do			
0500-0600	Canada, CFRX Toronto	6070do			
0500-0600	Canada, CFVP Calgary	6030do			
0500-0600	Canada, CHNX Halifax	6130do			
0500-0600	Canada, CKZN St John's	6160do			
0500-0600	Canada, CKZU Vancouver	6160do			
0500-0529	Canada, R Canada Intl	5995na	6145eu	7295eu	9595eu
	9755na 11710eu	11830na	13755eu	15330eu	15400eu
0500-0600	Costa Rica,RF Peace Intl	6975am	15050am		
0500-0600	Cuba, Radio Havana	9550na	9820na	9830na	
0500-0600	Ecuador, HCJB	9745na	12015na	21455va	
0500-0545	Germany, Deutsche Welle	9615am	9670na	11795na	11810na
0500-0600	Germany,Overcomer Ministr	9425eu			
0500-0600	Guyana, GBC/Voice of	5950do			
0500-0515	Israel, Kol Israel	9435va	11605va	17535au	
0500-0600 as/vl	Italy, IRRS	3985va			
0500-0600	Japan, Radio/NHK	6110na	7230eu	11715as	11760as
	11840as	11850pa	15230pa	15590as	17825na
0500-0600	Kenya, Kenya BC Corp	4885do	4935do		
0500-0600 vl	Lesotho, Radio	4800do			
0500-0600	Liberia,LCN/R Liberia Int	5100do			
0500-0510 vl/m-f	Malawi, MBC	5993do			
0500-0600	Malaysia, Radio	7295do			
0500-0600	Malaysia, RTM Sarawak	7160do			
0500-0600	Malaysia, Voice of	6175as	9750as	15295as	
0500-0530 twhfa	Mexico, Radio Mexico Intl	9705am			
0500-0525	Netherlands, Radio	6165na	9590na		
0500-0600	New Zealand, R NZ Intl	17675va			
0500-0600 vl	Nigeria, Radio/Ibadan	6050do			
0500-0600 vl	Nigeria, Radio/Kaduna	4770do			
0500-0600	Nigeria, Radio/Lagos	3326do			
0500-0600	Nigeria, Voice of	7255af	15120va		
0500-0600	North Korea, R Pyongyang	11710eu	13790as		
0500-0504	Pakistan, Radio	9645do			
0500-0600 vl	Papua New Guinea, NBC	9675do			
0500-0600	Russia,Voice of Russia WS	7125na	9665na	12050na	15425na
		15455na	15465na	15495na	15595na
		17565na	17630na	17660na	17690na
0500-0530	S Africa, AWR Africa	5960af			
0500-0530	S Africa, Channel Africa	11720af			
0500-0600	Singapore,RCorp Singapore	6150do			
0500-0600 vl	Solomon Islands, SIBC	5020do			
0500-0556	Spain, R Exterior Espana	6055na			
0500-0505	Swaziland, Trans World R	3200af	4775af		
0500-0530	Switzerland, Swiss R Intl	13635eu			
0500-0600	Uganda, Radio	4976do			
0500-0600	UK, BBC World Service	3255af	3955eu	5975am	6005af
	6175am 6180eu	6190af	6195eu	7160af	9410eu
	9740as 11760me	11765af	11955pa	12095pa	15280as
	15310as 15360as	15420af	15575as	17640af	17760as
	17790as 17885af	21660as			
0500-0600	USA, KAIJ Dallas TX	5810na			
0500-0600	USA, KTBN Salt Lk City UT	7510na			
0500-0600	USA, KWHR Naalehu HI	17780as			
0500-0600	USA, Voice of America	5970af	6035af	6080af	7170af
	7195af	9630af	11965me	12080af	15205va
0500-0600	USA, WBCQ Monticello ME	7415na			
0500-0600	USA, WEWN Birmingham AL	5825va			
0500-0600	USA, WGTG McCaysville GA	5085am	6890am		
0500-0600	USA, WHRA Greenbush ME	11565af			
0500-0600	USA, WHRI Noblesville IN	5745na	7315sa		
0500-0600	USA, WJCR Upton KY	7490na			
0500-0600	USA, WRNO New Orleans LA	7395na			
0500-0600	USA, WSHB Cypress Crk SC	7535eu	9840af		
0500-0600	USA, WWCR Nashville TN	2390na	3210na	5070na	5935na
0500-0600	USA, WYFR Okeechobee FL	5985na	9985eu	11580eu	
0500-0520	Vatican City, Vatican R	9660af	11625af	15570af	
0500-0600	Zambia, Christian Voice	6065do			
0500-0600	Zambia, Natl BC Corp	6165do	6265do		
0500-0530 vl	Zimbabwe, Zimbabwe BC	3306do	4828do		
0505-0520	Croatia, Croatian Radio	9925na			
0505-0600 mtwhf	Swaziland, Trans World R	4775af	6100af	9500af	
0515-0555 vl	Honduras, HRMI	5890am			
0520-0530	Vatican City, Vatican R	9660af	11625af	15570af	
0525-0600	Ghana, Ghana BC Corp	3366do	4915do		
0530-0600	Austria, R Austria Intl	6015na			
0530-0600	Kiribati, Radio	9810do			
0530-0600 a	Kyrgyzstan, Kyrgyz Radio	4010do	4050do		
0530-0600	Serbia, Radio Yugoslavia	9580eu	11850eu		
0530-0600	Thailand, Radio	9655eu	11905eu	15445eu	
0530-0600	UAE, Radio Dubai	15435au	17830au	21700au	
0530-0600 vl	Zimbabwe, Zimbabwe BC	4828do	5012do		

Selected Programs

Sundays

0500 Australia, Radio: RA News. See S 0000.
0500 Ecuador, HCJB Quito (am): Saludos Amigos. See S 0030.
0500 USA, WWCR #1 Nashville TN: The Great American Polka Show. An hour of polka favorites both old and new.
0500 USA, WWCR #3 Nashville TN: USA Radio News. See S 0400.
0505 Australia, Radio: Pacific Review. New program - no information available.
0505 USA, WWCR #3 Nashville TN: The Right Perspective (live). See S 0405.
0530 Australia, Radio: In Conversation. A guest interview program.
0530 Ecuador, HCJB Quito (am): Afterglow. Don Johnson plays religious music.
0530 USA, WWCR #1 Nashville TN: The Lutheran Reformation Hour. Richard Shekner preaches from Chicago Heights, Illinois.

Monday-Friday

0500 Australia, Radio: RA News. See S 0000.
0510 Australia, Radio: Pacific Beat. The magazine that provides a focus on the people and issues of the region.
0530 Australia, Radio: Sport. Five or ten minutes of sports news.
0540 Australia, Radio: Pacific Beat. See M 0510.

Mondays

0500 Ecuador, HCJB Quito (am): Sunday Nite. See M 0200.
0500 USA, WWCR #1 Nashville TN: World of Radio. See S 0230.
0500 USA, WWCR #3 Nashville TN: USA Radio News. See S 0400.
0505 USA, WWCR #3 Nashville TN: Lyra/New Life. Joe Allen.
0530 USA, WWCR #1 Nashville TN: Communications World ABC. See S 0200.

Tuesdays

0500 Ecuador, HCJB Quito (am): Simply Worship. See S 1400.
0500 USA, WWCR #1 Nashville TN: The Overcomer Broadcast (live). See M 1200.
0500 USA, WWCR #3 Nashville TN: Ask WWCR. See M 0430.
0515 USA, WWCR #3 Nashville TN: Honey in the Rock. Marie Hornsby.
0530 Ecuador, HCJB Quito (am): Let My People Think. See T 0230.

Wednesdays

0500 Ecuador, HCJB Quito (am): The Book and the Spade. See W 0200.
0500 USA, WWCR #1 Nashville TN: The Overcomer Broadcast (live). See M 1200.
0500 USA, WWCR #3 Nashville TN: Divine Network. Lowell Brooks.
0515 Ecuador, HCJB Quito (am): Words for Women. See W 0215.
0530 Ecuador, HCJB Quito (am): Unshackled. See W 0230.
0530 UK, BBC London (AE am only): Paul McCartney's Routes of Rock (3rd,10th). A four-part series that began in October recorded at the ex-Beatle's home in East sussex. Sir Paul plays selections of his favorite records--revealing what they mean to him.

Thursdays

0500 Ecuador, HCJB Quito (am): Rock Solid!. See S 0200.
0500 USA, WWCR #1 Nashville TN: The Overcomer Broadcast (live). See M 1200.
0500 USA, WWCR #3 Nashville TN: Joni and Friends. See M 1315.
0505 USA, WWCR #3 Nashville TN: Messianic Minutes. See M 1320.
0510 USA, WWCR #3 Nashville TN: Life Issues. See M 1325.
0530 UK, BBC London (AS): Paul McCartney's Routes of Rock (17th,24th). See W 0530.

Fridays

0500 Ecuador, HCJB Quito (am): Sounds of Joy. Bob Carlson with old recordings of sacred music.
0500 USA, WWCR #1 Nashville TN: The Overcomer Broadcast (live). See M 1200.
0500 USA, WWCR #3 Nashville TN: A Visit with Mrs. G. Bible stories for children.
0530 Ecuador, HCJB Quito (am): Inspirational Classics. See F 0230.

Saturdays

0500 Australia, Radio: RA News. See S 0000.
0500 Ecuador, HCJB Quito (am): Inside HCJB. See A 0200.
0500 USA, WWCR #1 Nashville TN: USA Radio News. See S 0400.
0500 USA, WWCR #3 Nashville TN: The Old Country Church. Allen Dickerson.
0505 Australia, Radio: Pacific Focus. See S 0605.
0505 USA, WWCR #1 Nashville TN: America's Greatest Heroes. USA Radio Network.
0530 Australia, Radio: Democracy and Nation. See S 0030.
0530 Ecuador, HCJB Quito (am): Walkin' in the Sunshine. See A 0230.
0530 USA, WWCR #3 Nashville TN: Battle Cry Sounding. See F 1230.

Frequencies

0600-0700	Anguilla,Caribbean Beacon	6090am			
0600-0700 vl	Australia, ABC/Katherine	5025do			
0600-0700 vl	Australia, ABC/Tent Creek	4910do			
0600-0700	Australia, Radio	9660pa	12080va	15240pa	15415as
		15515va	17580va	17750as	21725pa
0600-0700 vl	Botswana, Radio	4820do	4830do	7255do	
0600-0700 vl	Canada, CBC N Quebec Svc	9625do			
0600-0700	Canada, CFRX Toronto	6070do			
0600-0700	Canada, CFVP Calgary	6030do			
0600-0700	Canada, CHNX Halifax	6130do			
0600-0700	Canada, CKZN St John's	6160do			
0600-0700	Canada, CKZU Vancouver	6160do			
0600-0700	Costa Rica,RF Peace Intl	6975am	15050am		
0600-0700	Cuba, Radio Havana	9550na	9820na	9830na	
0600-0700	Ecuador, HCJB	9745na	12015na	21455va	
0600-0645	Germany, Deutsche Welle	11915af	13790af	15185af	17820as
		17860af	21680me		
0600-0700	Germany,Overcomer Ministr	13810au			
0600-0630	Ghana, Ghana BC Corp	3366do	4915do		
0600-0700	Guyana, GBC/Voice of	5950do			
0600-0630 vl	Italy, IRRS	3985va			
0600-0700	Japan, Radio/NHK	5975eu	7230eu	11740as	11840as
		11850pa	17825na		
0600-0700	Kenya, Kenya BC Corp	4885do	4935do		
0600-0700	Kiribati, Radio	9810do			
0600-0700 vl	Lesotho, Radio	4800do			
0600-0700	Liberia,LCN/R Liberia Int	5100do			
0600-0700	Malaysia, Radio	7295do			
0600-0700	Malaysia, RTM Sarawak	7160do			
0600-0700	Malaysia, Voice of	6175as	9750as	15295as	
0600-0700	Namibia, NBC	7165af			
0600-0700	New Zealand, R NZ Intl	17675va			
0600-0700 vl	Nigeria, Radio/Ibadan	6050do			
0600-0700 vl	Nigeria, Radio/Kaduna	4770do			
0600-0700	Nigeria, Radio/Lagos	3326do			
0600-0700	Nigeria, Voice of	7255af	15120va		
0600-0700 vl	Papua New Guinea, NBC	9675do			
0600-0641	Romania, R Romania Intl	11725na	11940na		
0600-0700	Russia,Voice of Russia WS	17625au	21790au		
0600-0630	S Africa, Channel Africa	15215af			
0600-0700	Sierra Leone, SLBS	3316do			
0600-0700	Singapore,RCorp Singapore	6150do			
0600-0700 vl	Solomon Islands, SIBC	5020do			
0600-0700 mtwhf	Swaziland, Trans World R	4775af	6100af	9500af	
0600-0700	UK, BBC World Service	5975am	6005af	6175am	6190af
	6195eu 7145pa	7160af	9410eu	9740as	11760me
	11765af 11940af	11955pa	12095eu	15310as	15360as
	15400af 15420af	15565eu	15575as	17640af	17760as
	17790as 17885af	21660as			
0600-0700	USA, KAIJ Dallas TX	5810na			
0600-0700	USA, KTBN Salt Lk City UT	7510na			
0600-0700	USA, KWHR Naalehu HI	17780as			
0600-0630	USA, Voice of America	5970af	6035af	6080af	7170va
		7195af	9630af	9680af	11805af
		11965me	11995af	12080af	15205va
0600-0700	USA, WBCQ Monticello ME	7415na			
0600-0700	USA, WEWN Birmingham AL	5825va			
0600-0700	USA, WHRA Greenbush ME	11565af			
0600-0700	USA, WHRI Noblesville IN	5745na	7315sa		
0600-0700	USA, WJCR Upton KY	7490na			
0600-0700	USA, WRNO New Orleans LA	7395na			
0600-0700	USA, WSHB Cypress Crk SC	13650af			
0600-0700	USA, WWCR Nashville TN	2390na	3210na	5070na	5935na
0600-0700	USA, WYFR Okeechobee FL	5985na	7355eu		
0600-0700 vl	Vanuatu, Radio	4960do			
0600-0620	Vatican City, Vatican R	4005eu	5883eu		
0600-0700	Yemen, Rep of Yemen Radio	9780do			
0600-0700	Zambia, Christian Voice	9865do			
0600-0700	Zambia, Natl BC Corp	6165do	6265do		
0600-0700 vl	Zimbabwe, Zimbabwe BC	4828do	5012do		
0605-0618	Croatia, Croatian Radio	9925na			
0630-0700	Austria, R Austria Intl	6015na			
0630-0700	Finland, YLE/R Finland	15250as	21670au		
0630-0700	Georgia, Georgian Radio	11805eu			
0630-0700 as	Italy, IRRS	7120va			
0630-0700 mtwhfa	Malta, VO Mediterranean	7155eu			
0630-0700	Switzerland, Swiss R Intl	13635eu			
0630-0700 as	UK, BBC World Service	17885af			
0630-0700	USA, Voice of America	7170af	9680af	11805af	11965me
		15205va			
0630-0700 as	USA, Voice of America	5970af	6035af	6080af	7195af
		9630af	11995af	12080af	
0630-0645	Vatican City, Vatican R	11625va	13765af	15570af	
0641-0700	Romania, R Romania Intl	9625eu	11725na	11775eu	11840eu
		11885eu	11940na	15270eu	
0645-0700	Vatican City, Vatican R	11625va	13795af	15570af	

Selected Programs

Sundays

0600 Australia, Radio: RA News. See S 0000.
0600 Ecuador, HCJB Quito (am): Mountain Meditations. A mixture of music and devotional thoughts in an Andean setting.
0600 USA, WWCR #1 Nashville TN: Music and Dancing. Miguel Dabul's program of music and inspiration originates from Norfolk, Virginia.
0600 USA, WWCR #3 Nashville TN: Prophecy Flash. William Dankenbring preaches about the second coming.
0605 Australia, Radio: Pacific Focus. Coverage of issues of relevance to people of the Pacific region.
0630 Australia, Radio: Correspondents' Report. See S 0010.
0630 Ecuador, HCJB Quito (am): Message of Truth. A word from Pastor Gary G. Dull.
0630 USA, WWCR #1 Nashville TN: The Old Record Shop. Ken Berryhill with thirty minutes of selections of music from the days of the 78 rpm record. Recommended.
0630 USA, WWCR #3 Nashville TN: World of Radio. See S 0230.

Monday-Friday

0600 Australia, Radio: RA News. See S 0000.
0600 USA, WWCR #1 Nashville TN: USA Radio News. See S 0400.
0600 USA, WWCR #3 Nashville TN: USA Radio News. See S 0400.
0605 USA, WWCR #3 Nashville TN: Freedom Calls. Bo Gritz hosts this talk radio program.
0615 Ecuador, HCJB Quito (am): Stories of Great Christians. Radio drama with Christian theme from the Moody Bible Institute.
0630 Australia, Radio: Sports. A half-hour of sports.
0630 Ecuador, HCJB Quito (am): Nightsounds. Christian music and thoughtful words from Bill Pearce.

Mondays

0600 Ecuador, HCJB Quito (am): Chords of Love. Music to encourage you.
0610 Australia, Radio: The Australian Music Show. Kim Taylor presents the music, people, and issues of the Australian contemporary music industry.
0635 USA, WWCR #1 Nashville TN: Ken's Country Classics. Key Berryhill with country music from a bygone era.

Tuesdays

0600 Ecuador, HCJB Quito (am): Commission Christian Radio Drama. A 13-week drama series from studios in Ireland.
0610 Australia, Radio: Presenter's Pleasure. See S 0030.
0635 USA, WWCR #1 Nashville TN: Natural Health Clinic. Terrance Sullivan of Oklahoma offers natural supplement products for the body.

Wednesdays

0600 Ecuador, HCJB Quito (am): CBF Presents. See W 0330.
0610 Australia, Radio: Blacktracker. Mal Honess with an insight into the music and performance of Australia's aborigines.
0635 USA, WWCR #1 Nashville TN: Natural Health Clinic. See T 0635.

Thursdays

0600 Ecuador, HCJB Quito (am): Science, Scripture and Salvation. Proving scientific principles with the Bible.
0610 Australia, Radio: Australian Country Style. Graham Bell goes up country.
0635 USA, WWCR #1 Nashville TN: Natural Health Clinic. See T 0635.

Fridays

0600 Ecuador, HCJB Quito (am): Wonderful Words of Life. See W 0345.
0610 Australia, Radio: Music Deli. See M 1605.
0635 USA, WWCR #1 Nashville TN: Natural Health Clinic. See T 0635.

Saturdays

0600 Australia, Radio: RA News. See S 0000.
0600 Ecuador, HCJB Quito (am): Alive!. See S 0300.
0600 USA, WWCR #1 Nashville TN: USA Radio News. See S 0400.
0600 USA, WWCR #3 Nashville TN: Steps to Christ. Charles Venturella.
0605 Australia, Radio: Feedback. See S 0330.
0605 USA, WWCR #1 Nashville TN: Rock the Universe. Rich Adcock's selections of rock recordings includes some rare treats.
0630 Australia, Radio: Arts Australia. Lisa Harris presents reviews and comment on current events within the Australian arts scene.
0630 USA, WWCR #3 Nashville TN: Words of Hope. See S 1100.
0645 USA, WWCR #3 Nashville TN: Wonderful Words of Life. The international ministry of the Salvation Army.

Frequencies

0700-0800	Anguilla,Caribbean Beacon	6090am			
0700-0800 vl	Australia, ABC/Katherine	5025do			
0700-0800 vl	Australia, ABC/Tent Creek	4910do			
0700-0800	Australia, Radio	9660pa	12080va	15240pa	15415as
		15515va	17580va	17750as	21725pa
0700-0800 vl	Botswana, Radio	4820do	4830do	7255do	
0700-0800	Canada, CFRX Toronto	6070do			
0700-0800	Canada, CFVP Calgary	6030do			
0700-0800	Canada, CHNX Halifax	6130do			
0700-0800	Canada, CKZN St John's	6160do			
0700-0800	Canada, CKZU Vancouver	6160do			
0700-0800	Costa Rica,RF Peace Intl	6975am			
0700-0705	Croatia, Croatian Radio	11880pa			
0700-0727	Czech Rep, R Prague Intl	9880eu	11600eu		
0700-0800	Ecuador, HCJB	9800eu	11755pa	21455va	
0700-0800	Eqt Guinea, Radio Africa	15186af			
0700-0800	Germany, Deutsche Welle	6140eu			
0700-0800 s	Germany, Good News World	13740as			
0700-0800	Germany, Voice of Hope	5975eu			
0700-0800	Germany,Overcomer Ministr	13810au			
0700-0715	Ghana, Ghana BC Corp	3366do	4915do		
0700-0800	Guyana, GBC/Voice of	5950do			
0700-0800 as	Italy, IRRS	7120va			
0700-0800	Kenya, Kenya BC Corp	4885do	4935do		
0700-0800	Kiribati, Radio	9810do			
0700-0800 vl	Lesotho, Radio	4800do			
0700-0715	Liberia,LCN/R Liberia Int	5100do			
0700-0800	Malaysia, Radio	7295do			
0700-0800	Malaysia, RTM Sarawak	7160do			
0700-0800	Malaysia, Voice of	6175as	9750as	15295as	
0700-0705	New Zealand, R NZ Intl	17675va			
0700-0800 vl	Nigeria, Radio/Ibadan	6050do			
0700-0800 vl	Nigeria, Radio/Kaduna	4770do			
0700-0800 vl	Nigeria, Voice of	7255af	15120va		
0700-0800	Palau, KHBN/Voice of Hope	9965as	9985as	13840as	15725as
0700-0730 vl	Papua New Guinea, NBC	9675do			
0700-0756	Romania, R Romania Intl	15340af	17745af		
0700-0800	Russia,Voice of Russia WS	15490au	17625au	17655as	21790au
0700-0800	Sierra Leone, SLBS	3316do			
0700-0800	Singapore,RCorp Singapore	6150do			
0700-0730	Slovakia, R Slovakia Intl	9440au	15460au	17550au	
0700-0800 vl	Solomon Islands, SIBC	5020do			
0700-0730 mtwhf	Swaziland, Trans World R	4775af	6100af	9500af	
0700-0720 a	Swaziland, Trans World R	4775af	6100af	9500af	
0700-0705 s	Swaziland, Trans World R	4775af	6100af	9500af	
0700-0800	Taiwan, Radio Taipei Intl	5950na			
0700-0800	UK, BBC World Service	6005af	6190af	7145af	9410eu
		9740as	11760me	11765af	11835af
		11940af	11955pa	12095eu	15310as
		15360as	15400af	15485eu	15565eu
		15575as	17640eu	17760as	17790as
		17830af	21660as		
0700-0715 as	UK, BBC World Service	17885af			
0700-0800	USA, KAIJ Dallas TX	5810na			
0700-0800	USA, KTBN Salt Lk City UT	7510na			
0700-0800	USA, KWHR Naalehu HI	11565as	17780as		
0700-0800	USA, WEWN Birmingham AL	5825va			
0700-0800	USA, WHRA Greenbush ME	11565af			
0700-0800	USA, WHRI Noblesville IN	5745na	7315sa		
0700-0800	USA, WJCR Upton KY	7490na			
0700-0800	USA, WRNO New Orleans LA	7395na			
0700-0800	USA, WSHB Cypress Crk SC	13650af			
0700-0800	USA, WWCR Nashville TN	2390na	3210na	5070na	5935na
0700-0745	USA, WYFR Okeechobee FL	7355eu	9985eu		
0700-0800	USA, WYFR Okeechobee FL	13695va			
0700-0800 vl	Vanuatu, Radio	4960do			
0700-0800	Zambia, Christian Voice	9865do			
0700-0800	Zambia, Natl BC Corp	6165do	6265do		
0700-0800 vl	Zimbabwe, Zimbabwe BC	4828do	5012do		
0706-0800	New Zealand, R NZ Intl	9700va			
0710-0715 s	Kyrgyzstan, Kyrgyz Radio	4010do	4050do		
0715-0800	UK, BBC World Service	15575af	17885af		
0725-0800	Myanmar, Radio	9730do			
0730-0800	Austria, R Austria Intl	6155eu	13730eu	15410eu	17870eu
0730-0800 t h	Georgia, Georgian Radio	6080me			
0730-0800 vl	Papua New Guinea, NBC	4890do			
0730-0735 mtwhf	Swaziland, Trans World R	4775af			
0730-0800	Switzerland, Swiss R Intl	15545af	17685af	21750af	
0730-0745 mtwhfa	Vatican City, Vatican R	4005eu	5883eu	7250eu	9645eu
		11740eu	15595eu		
0740-0800	Guam, TWR/KTWR	15200as			
0745-0755 as	Monaco, Trans World Radio	6045eu	9870eu		
0755-0800 mtwhf	Monaco, Trans World Radio	6045eu	9870eu		

0800-0900	Anguilla,Caribbean Beacon	6090am			
0800-0830 vl	Australia, ABC/Katherine	5025do			
0800-0830 vl	Australia, ABC/Tent Creek	4910do			
0800-0900	Australia, Radio	5995pa	9710pa	11650va	12080va
		13605va	15515va	17580va	21725pa
0800-0826	Belgium,R Vlaanderen Intl	9925eu	15195eu		
0800-0900 vl	Botswana, Radio	4820do	4830do	7255do	
0800-0900 vl	Canada, CBC N Quebec Svc	9625do			
0800-0900	Canada, CFRX Toronto	6070do			
0800-0900	Canada, CFVP Calgary	6030do			
0800-0900	Canada, CHNX Halifax	6130do			
0800-0900	Canada, CKZN St John's	6160do			
0800-0900	Canada, CKZU Vancouver	6160do			
0800-0900	Costa Rica,RF Peace Intl	6975am			
0800-0805	Croatia, Croatian Radio	13820pa			
0800-0900	Ecuador, HCJB	9800eu	11755pa	21455va	
0800-0900	Eqt Guinea, Radio Africa	15186af			
0800-0900	Germany, Deutsche Welle	6140eu			
0800-0900	Germany, Voice of Hope	5975eu			
0800-0900	Germany,Overcomer Ministr	13810au			
0800-0805	Ghana, Ghana BC Corp	4915do			
0800-0900	Guam, TWR/KTWR	15200as	15330as		
0800-0900	Guyana, GBC/Voice of	5950do			
0800-0900	Indonesia, Voice of	9525va			
0800-0900 as/vl	Italy, IRRS	7120va			
0800-0900	Kenya, Kenya BC Corp	4885do	4935do		
0800-0900	Kiribati, Radio	9810do			
0800-0900 vl	Lesotho, Radio	4800do			
0800-0900	Liberia,LCN/R Liberia Int	5100do			
0800-0900	Malaysia, Radio	7295do			
0800-0825	Malaysia, Voice of	6175as	9750as	15295as	
0800-0900 vl	Malaysia,RTM KotaKinabalu	5980do			
0800-0900 mtwhf	Monaco, Trans World Radio	6045eu	9870eu		
0800-0830	Myanmar, Radio	9730do			
0800-0900	N Marianas, KFBS Saipan	11650as	15380as		
0800-0900	New Zealand, R NZ Intl	9700va			
0800-0900 vl	Nigeria, Radio/Ibadan	6050do			
0800-0900 vl	Nigeria, Radio/Kaduna	4770do			
0800-0900	Nigeria, Radio/Lagos	3326do			
0800-0900	Palau, KHBN/Voice of Hope	9955as	9985as	13840va	15725as
0800-0900 vl	Papua New Guinea, NBC	4890do			
0800-0900	Russia,Voice of Russia WS	17495au	17625au	17665au	21790au
0800-0900	Sierra Leone, SLBS	5980do			
0800-0900	Singapore,RCorp Singapore	6150do			
0800-0900	South Korea, R Korea Intl	9570au	13670eu		
0800-0900	UK, BBC World Service	6190af	9740as	11940af	11955pa
		12095eu	15310as	15360as	15400af
		15485eu	15565eu	17640eu	17760as
		17790as	17830af	21660as	
0800-0900 as	UK, BBC World Service	15575as	17885af		
0800-0900	USA, KAIJ Dallas TX	5810na			
0800-0900	USA, KNLS Anchor Point AK	9615as			
0800-0900	USA, KTBN Salt Lk City UT	7510na			
0800-0900	USA, KWHR Naalehu HI	11565pa	17780as		
0800-0900	USA, Voice of America	11775as	13610as	15150as	
0800-0900	USA, WEWN Birmingham AL	5825va			
0800-0900	USA, WHRA Greenbush ME	11565af			
0800-0900	USA, WHRI Noblesville IN	5745na	7315sa		
0800-0900	USA, WJCR Upton KY	7490na			
0800-0900	USA, WRNO New Orleans LA	7395na			
0800-0900	USA, WSHB Cypress Crk SC	9845pa	9860eu		
0800-0900	USA, WWCR Nashville TN	2390na	3210na	5070na	5935na
0800-0900 vl	Vanuatu, Radio	4960do			
0800-0900	Zambia, Christian Voice	9865do			
0800-0900	Zambia, Natl BC Corp	6165do	6265do		
0800-0900 vl	Zimbabwe, Zimbabwe BC	4828do	5012do		
0804-0820	Pakistan, Radio	15530eu	17835eu		
0815-0900 f	Seychelles, FEBA Radio	15460as			
0830-0900 vl	Australia, ABC/Alice Spgs	2310do			
0830-0900 vl	Australia, ABC/Katherine	2485do			
0830-0900 vl	Australia, ABC/Tent Creek	2325do			
0830-0900	Australia, Radio	17750as			
0830-0900	Austria, R Austria Intl	21650as	21765as		
0830-0900	Georgia, Georgian Radio	11910eu			
0830-0900 vl	Solomon Islands, SIBC	5020do			
0830-0900	Switzerland, Swiss R Intl	9885as	13685as		
0845-0900 mtwhf	USA, WRMI/R Miami Intl	9955am			

Frequencies

0900-1000	Anguilla,Caribbean Beacon	6090am			
0900-1000 vl	Australia, ABC/Alice Spgs	2310do			
0900-1000 vl	Australia, ABC/Katherine	2485do			
0900-1000 vl	Australia, ABC/Tent Creek	2325do			
0900-1000	Australia, Radio	11650va	11880as	13605as	17750as
		21820as			
0900-0910 s	Bhutan, Bhutan BC Service	6030do			
0900-1000 vl	Botswana, Radio	4820do	4830do	7255do	
0900-1000	Canada, CFRX Toronto	6070do			
0900-1000	Canada, CFVP Calgary	6030do			
0900-1000	Canada, CHNX Halifax	6130do			
0900-1000	Canada, CKZN St John's	6160do			
0900-1000	Canada, CKZU Vancouver	6160do			
0900-0956	China, China Radio Intl	11730pa	15210pa		
0900-1000	Costa Rica,RF Peace Intl	6975am			
0900-0905	Croatia, Croatian Radio	13820au			
0900-0929	Czech Rep, R Prague Intl	21745va			
0900-1000	Ecuador, HCJB	11775pa	21455va		
0900-1000	Eqt Guinea, Radio Africa	15186af			
0900-0945	Germany, Deutsche Welle	6140eu	6160pa	9565af	15210af
	15410af	17560as	17800af	21680as	21790af
0900-1000 a	Germany, Good News World	5995eu			
0900-1000	Germany, Voice of Hope	5975eu			
0900-1000	Germany,Overcomer Ministr	13810au			
0900-0915	Ghana, Ghana BC Corp	4915do	6130do		
0900-0930	Guam, TWR/KTWR	15330as			
0900-1000	Guyana, GBC/Voice of	5950do			
0900-1000 as/vl	Italy, IRRS	7120va			
0900-1000	Kenya, Kenya BC Corp	4935do			
0900-0930	Kiribati, Radio	9810do			
0900-1000 vl	Lesotho, Radio	4800do			
0900-0915	Liberia,LCN/R Liberia Int	5100do			
0900-1000	Malaysia, Radio	7295do			
0900-1000 vl	Malaysia,RTM KotaKinabalu	5980do			
0900-1000 s	Malta, VO Mediterranean	11770eu			
0900-0920 mtwhf	Monaco, Trans World Radio	6045eu	9870eu		
0900-1000	N Marianas, KFBS Saipan	9495as	11650as	15380as	
0900-1000	N Marianas, KHBI Saipan	11660as	15665as		
0900-1000	New Zealand, R NZ Intl	9700va			
0900-1000 vl	Nigeria, Radio/Ibadan	6050do			
0900-1000 vl	Nigeria, Radio/Kaduna	4770do			
0900-1000	Nigeria, Radio/Lagos	3326do			
0900-1000	Palau, KHBN/Voice of Hope	9955as	9965as	9985as	13840va
		15725as			
0900-1000 vl	Papua New Guinea, NBC	4890do			
0900-1000	Russia,Voice of Russia WS	15490au	17495au	17625au	21790au
0900-1000	Sierra Leone, SLBS	5980do			
0900-1000	Singapore,RCorp Singapore	6150do			
0900-1000 vl	Solomon Islands, SIBC	5020do			
0900-1000	Tanzania, Radio	5050af			
0900-1000	UK, BBC World Service	6065as	6190af	6195as	9580as
	9740as	11760me	11765pa	11940af	11945as
	11955as	12095eu	15190sa	15310as	15360as
	15400af	15485eu	15565eu	15575as	17640eu
	17760as	17790as	17830af	17885af	21660as
0900-1000	USA, KAIJ Dallas TX	5810na			
0900-1000	USA, KTBN Salt Lk City UT	7510na			
0900-1000	USA, KWHR Naalehu HI	11565pa	17780as		
0900-1000	USA, Voice of America	11775as	13610as	15150as	15665as
0900-1000	USA, WEWN Birmingham AL	5825va			
0900-1000	USA, WHRA Greenbush ME	11565af			
0900-1000	USA, WHRI Noblesville IN	5745na	7315na		
0900-1000	USA, WJCR Upton KY	7490na			
0900-1000 mtwhf	USA, WRMI/R Miami Intl	9955am			
0900-1000	USA, WRNO New Orleans LA	7395na			
0900-1000	USA, WSHB Cypress Crk SC	9455sa	9860eu		
0900-1000	USA, WWCR Nashville TN	2390na	3210na	5070na	5935na
0900-1000	Zambia, Christian Voice	9865do			
0900-1000	Zambia, Natl BC Corp	6165do	6265do		
0900-1000 vl	Zimbabwe, Zimbabwe BC	4828do	5012do		
0920-0930 t	Kyrgyzstan, Kyrgyz Radio	4010do	4050do		
0920-0950 s	Monaco, Trans World Radio	6045eu	9870eu		
0930-1000	Georgia, Georgian Radio	11910me			
0930-1000	Guam, TWR/KTWR	9865as			
0930-1000	Italy, AWR Europe	7230eu			
0930-1000	Netherlands, Radio	9820au	12065as	13710as	
0930-1000	Philippines, FEBC R Intl	11635as			
0945-1000	Germany, Deutsche Welle	6140eu			
0950-0945 a	UK, BBC World Service	6095as	9580as	11945as	11955as
		15280as			
1000-1100	Anguilla,Caribbean Beacon	11775am			
1000-1030	Armenia, Voice of	4810eu	15270eu		
1000-1100 vl	Australia, ABC/Alice Spgs	2310do			
1000-1100 vl	Australia, ABC/Katherine	2485do			
1000-1100 vl	Australia, ABC/Tent Creek	2325do			
1000-1100	Australia, Radio	11650va	11880as	17750as	21820as
1000-1100 vl	Botswana, Radio	4820do	4830do	7255do	
1000-1100 vl	Canada, CBC N Quebec Svc	9625do			
1000-1100	Canada, CFRX Toronto	6070do			
1000-1100	Canada, CFVP Calgary	6030do			
1000-1100	Canada, CHNX Halifax	6130do			
1000-1100	Canada, CKZN St John's	6160do			
1000-1100	Canada, CKZU Vancouver	6160do			
1000-1056	China, China Radio Intl	11730pa	15210pa		
1000-1100	Costa Rica,RF Peace Intl	6975am			
1000-1100	Ecuador, HCJB	11755pa	15115pa	21455va	
1000-1100	Eqt Guinea, Radio Africa	15186af			
1000-1100	Germany, Deutsche Welle	6140eu			
1000-1100	Germany, Voice of Hope	5975eu			
1000-1100	Guam, AWR/KSDA	11560as			
1000-1100	Guam, TWR/KTWR	9865as			
1000-1100	Guyana, GBC/Voice of	5950do			
1000-1100	India, All India Radio	11585as	11737au	13700as	15020as
		17385au	17840as		
1000-1100 as/vl	Italy, IRRS	7120va			
1000-1100	Japan, Radio/NHK	9695as	11850pa	15590as	
1000-1100	Kenya, Kenya BC Corp	4935do			
1000-1100 vl	Lesotho, Radio	4800do			
1000-1100	Malaysia, Radio	7295do			
1000-1100 vl	Malaysia,RTM KotaKinabalu	5980do			
1000-1100	N Marianas, KFBS Saipan	9495as	11650as	15380as	
1000-1100	N Marianas, KHBI Saipan	11660as	15665as		
1000-1030	Netherlands, Radio	9820au	12065as	13710as	
1000-1100	New Zealand, R NZ Intl	9700va			
1000-1100 vl	Nigeria, Radio/Ibadan	6050do			
1000-1100 vl	Nigeria, Radio/Kaduna	4770do			
1000-1100 vl	Nigeria, Voice of	7255af	15120va		
1000-1100	Palau, KHBN/Voice of Hope	9955as	9965as	9985as	13840va
		15725as			
1000-1100 vl	Papua New Guinea, NBC	4890do			
1000-1100	Philippines, FEBC R Intl	11635as			
1000-1100	Sierra Leone, SLBS	5980do			
1000-1030	Singapore, RTE Radio	11740as			
1000-1100	Singapore,RCorp Singapore	6150do			
1000-1100 vl	Solomon Islands, SIBC	5020do			
1000-1030	Tanzania, Radio	5050af			
1000-1100	UK, BBC World Service	5965am	6195va	9740as	11760me
	11765pa	11940af	12095eu	15310as	15360as
	15485eu	15565eu	15575as	17640eu	17760as
	17790as	17885af	21660as		
1000-1100 as	UK, BBC World Service	15190sa	15400af	17830af	
1000-1100	USA, KAIJ Dallas TX	5810na			
1000-1100	USA, KTBN Salt Lk City UT	7510na			
1000-1100	USA, KWHR Naalehu HI	9930as	11565pa		
1000-1100	USA, Voice of America	6165ca	7405ca	9590ca	9770pa
	11660as	11720as	15240as	15425as	15665as
1000-1100	USA, WEWN Birmingham AL	7425na	15745eu		
1000-1100	USA, WHRI Noblesville IN	6040na	9495am		
1000-1100	USA, WJCR Upton KY	7490na			
1000-1100 mtwhfa	USA, WRMI/R Miami INtl	9955am			
1000-1100	USA, WRNO New Orleans LA	7395na			
1000-1100	USA, WSHB Cypress Crk SC	6095am	9455sa		
1000-1100 as	USA, WWBS Macon GA	11900na			
1000-1100	USA, WWCR Nashville TN	2390na	3210na	5070na	5935na
1000-1027	Vietnam, Voice of	9840va	12020as		
1000-1100	Zambia, Christian Voice	9865do			
1000-1100	Zambia, Natl BC Corp	6165do	6265do		
1000-1100 vl	Zimbabwe, Zimbabwe BC	4828do	5012do		
1005-1010 s	Croatia, Croatian Radio	7365eu	9830eu	13820va	
1030-1057	Czech Rep, R Prague Intl	9880eu	11615eu		
1030-1100	Ethiopia, Radio	5990do	7110do	9705do	
1030-1100	Lithuania, Radio Vilnius	9555eu	9710eu		
1030-1100	Malaysia, RTM Sarawak	7160do			
1030-1100	Netherlands, Radio	6045eu	9820as	9860eu	12065as
		13710as			
1030-1100	South Korea, R Korea Intl	11715na			
1030-1100 as	Tanzania, Radio	5050af			
1030-1100	UAE, Radio Dubai	13675eu	15370eu	15395eu	21605eu



Your Name in Lights!

... or at least in ink within the *Monitoring Times* Shortwave Guide. Please send us your "best catches" on the worldwide shortwave bands — QSLs, that is — and we will try to use them in future issues of *MT*. Your QSLs will be returned.

Frequencies

1100-1200	Anguilla,Caribbean Beacon	11775am			
1100-1200 vl	Australia, ABC/Alice Spgs	2310do			
1100-1200 vl	Australia, ABC/Katherine	2485do			
1100-1200 vl	Australia, ABC/Tent Creek	2325do			
1100-1200	Australia, Radio	5995pa	6020pa	9580va	11650va
		21820as			
1100-1200 vl	Botswana, Radio	4820do	4830do	7255do	
1100-1200	Canada, CFRX Toronto	6070do			
1100-1200	Canada, CFVP Calgary	6030do			
1100-1200	Canada, CHNX Halifax	6130do			
1100-1200	Canada, CKZN St John's	6160do			
1100-1200	Canada, CKZU Vancouver	6160do			
1100-1200	Costa Rica,RF Peace Intl	6975am			
1100-1200	Ecuador, HCJB	12005ca	15115am	21455va	
1100-1200	Eqt Guinea, Radio Africa	15186af			
1100-1145	Germany, Deutsche Welle	6140eu	15370af	15410af	17680af
1100-1200 as	Ghana, Ghana BC Corp	4915do	6130do		
1100-1200	Guyana, GBC/Voice of	5950do			
1100-1200	Iran, VOIRI	15430me	17560as	21510as	
1100-1200 as/vl	Italy, IRRS	7120va			
1100-1200	Japan, Radio/NHK	6120na	9695as	15590as	
1100-1200	Jordan, Radio	11690eu			
1100-1200	Kenya, Kenya BC Corp	4935do			
1100-1110 fa	Kyrgyzstan, Kyrgyz Radio	4010do	4050do		
1100-1200 vl	Lesotho, Radio	4800do			
1100-1110	Liberia,LCN/R Liberia Int	5100do			
1100-1200	Malaysia, Radio	7295do			
1100-1200 vl	Malaysia,RTM KotaKinabalu	5980do			
1100-1200	N Marianas, KFBS Saipan	9495as	11650as	15380as	
1100-1200	N Marianas, KHBI Saipan	9355as			
1100-1125	Netherlands, Radio	6045eu	9820au	9860eu	12065as
		13710as			
1100-1105	New Zealand, R NZ Intl	9700va			
1100-1200 vl	Nigeria, Radio/Ibadan	6050do			
1100-1200 vl	Nigeria, Radio/Kaduna	4770do			
1100-1200 vl	Nigeria, Voice of	7255af	15120va		
1100-1200	North Korea, R Pyongyang	3560as	9640af	9850as	9975me
		11335am	13650va		
1100-1120	Pakistan, Radio	7110do	11835do		
1100-1200	Palau, KHBN/Voice of Hope	9955as	9965as	9985as	13840va
		15725as			
1100-1200 vl	Papua New Guinea, NBC	4890do			
1100-1200	Sierra Leone, SLBS	5980do			
1100-1200	Singapore,R Singapore Int	6015as	6150as		
1100-1130 vl	Solomon Islands, SIBC	5020do			
1100-1200	Switzerland, Swiss R Intl	13735as	21770as		
1100-1130	Switzerland, Swiss R Intl	15315eu			
1100-1200	Taiwan, Voice of Asia	7445as			
1100-1200 as	Tanzania, Radio	5050af			
1100-1130 mtwhf	UK, BBC Caribbean Report	6195ca	15220ca		
1100-1200	UK, BBC World Service	5965am	6190af	6195va	9580as
	9740as 11760me	11940af	11955as	12095eu	15280as
	15310as 15400af	15485eu	15565eu	15575as	17640eu
	17705as 17790sa	17830af	17885af	21660af	
1100-1130 as	UK, BBC World Service	15190sa	15220am		
1100-1200	USA, KAIJ Dallas TX	5810na			
1100-1200	USA, KTBN Salt Lk City UT	7510na			
1100-1200	USA, KWHR Naalehu HI	9930as	11565pa		
1100-1200	USA, Voice of America	6160as	9355as	9645as	9760as
	9770as	11720as	15160as	15240as	15425as
1100-1130 mtwhf	USA, Voice of America	13675af	15510af	17690af	17780af
		21705af			
1100-1200	USA, WEWN Birmingham AL	7425na	15745eu		
1100-1200	USA, WHRI Noblesville IN	6040na	9495am		
1100-1200	USA, WJCR Upton KY	7490na			
1100-1200	USA, WRNO New Orleans LA	7395na			
1100-1200	USA, WSHB Cypress Crk SC	6095am	11660am		
1100-1200 as	USA, WWBS Macon GA	11900na			
1100-1200	USA, WWCR Nashville TN	2390na	5070na	5935na	12160na
1100-1200	USA, WYFR Okeechobee FL	5850na	6015na		
1100-1130	Vietnam, Voice of	7285as			
1100-1200	Zambia, Christian Voice	9865do			
1100-1200	Zambia, Natl BC Corp	6165do	6265do		
1100-1200 vl	Zimbabwe, Zimbabwe BC	4828do	5012do		
1105-1200 occsnal	New Zealand, R NZ Intl	6100va			
1115-1145	Nepal, Radio	5005as	7165as		
1115-1130 mtwhfa	Vatican City, Vatican R	5883eu	9645eu	11740eu	15595eu
		21850va			
1125-1200	Netherlands, Radio	6045eu	9860eu		
1130-1200	China, China Radio Intl	8660as	11700as		
1130-1135	Israel, Kol Israel	15650va	17535va		
1130-1200 vl	Libya, Voice of Africa	15235va	15415va	15435va	
1130-1200	Sweden, Radio	18960na	21810na		
1130-1200 as	UK, BBC World Service	15310as			
1130-1200 f	Vatican City, Vatican R	15595au	17550au		
1145-1200	Germany, Deutsche Welle	6140eu			

Selected Programs

Sundays

1100 Australia, Radio: RA News. See S 0000.
1100 Ecuador, HCJB Quito (am): Morning Song. Music and thoughts to start the day.
1100 USA, WWCR #1 Nashville TN: Words of Hope. Eugene Brown preaches from McFerrin Missionary Baptist Church of Nashville, Tennessee.
1100 USA, WWCR #3 Nashville TN: USA Radio News. See S 0400.
1105 Australia, Radio: Jazz Notes. The best of Australian jazz is introduced by Ivan Lloyd.
1105 USA, WWCR #3 Nashville TN: Inspirations Across America (hour 1). Bert Johnson plays contemporary Christian music.
1115 USA, WWCR #1 Nashville TN: Love Light. Kenneth Peterson.
1130 Australia, Radio: In Conversation. See S 0530.
1130 Ecuador, HCJB Quito (am): The Living Word. Brother Bob Russell of Southeast Christian Church of Louisville, Kentucky conducts the sermon.
1130 USA, WWCR #1 Nashville TN: Staff of Life. Irene Armstrong evangelizes from Zion, Illinois.
1145 USA, WWCR #1 Nashville TN: Sonshine. Lloyd Meyer.

Monday-Friday

1100 Australia, Radio: RA News. See S 0000.
1100 Ecuador, HCJB Quito (am): Insight for Living. Chuck Swindoll applies the Bible to life today.
1100 USA, WWCR #3 Nashville TN: Newswatch Magazine. David Smith compares world news to bible prophecy and is anti-United Nation.
1105 Australia, Radio: Asia Pacific (repeat). News and analysis from across the Pacific and Asia with Di Martin.
1128 Ecuador, HCJB Quito (am): Money Minute. See M 0200.
1130 Australia, Radio: Sport. See M 0530.
1130 Ecuador, HCJB Quito (am): Morning in the Mountains. Chris Fonte with a light-hearted mix of music, conversation and news helps you start your morning with a live program of music, news, scripture reading, and sports.
1131 Ecuador, HCJB Quito (am): Latin American News. Regional news summary.

Mondays

1100 USA, WWCR #1 Nashville TN: Voice of the Past. Lewis Franklin.
1115 USA, WWCR #1 Nashville TN: Phil Hensler Ministry. Phil Hensler.
1130 USA, WWCR #1 Nashville TN: Grace and Truth. Reginald Mitchell.
1135 Australia, Radio: Life Matters. Geraldine Doogue and Norman Swan talk with the main people behind Australia's social policies.

Tuesdays

1100 USA, WWCR #1 Nashville TN: Afterglow. Don Johnson plays beautiful sacred music.
1130 USA, WWCR #1 Nashville TN: Fighting the Good Fight. Dan Comer.
1135 Australia, Radio: Life Matters. See M 1135.

Wednesdays

1100 USA, WWCR #1 Nashville TN: We Believe. Jim Walsh focuses on bringing Christians back together.
1130 USA, WWCR #1 Nashville TN: Faith for Today. William Rowe of Pennsylvania with a bible-teaching program.
1135 Australia, Radio: Life Matters. See M 1135.

Thursdays

1100 USA, WWCR #1 Nashville TN: The Big Backyard. Thirty minutes of rock music from Australia.
1115 USA, WWCR #1 Nashville TN: Willingheart. Rick Booye of Trail Christian Fellowship in Medford, Oregon teaches the New Testament.
1130 BBC London (AE): Assignment. The BBC world Service documentary series that examines topical issues around the globe returns for a new series.
1135 Australia, Radio: Life Matters. See M 1135.

Fridays

1100 USA, WWCR #1 Nashville TN: Spiritual Awakening. James Bean with wisdom from the scriptures.
1130 USA, WWCR #1 Nashville TN: World Crusade. Kent Clark.
1135 Australia, Radio: Life Matters. See M 1135.
1145 USA, WWCR #1 Nashville TN: Walking with the Word. ReAnne Hyde.

Saturdays

1100 Australia, Radio: RA News. See S 0000.
1100 Ecuador, HCJB Quito (am): Your Story Hour. Dramatized children's stories.
1100 USA, WWCR #1 Nashville TN: USA Radio News. See S 0400.
1100 USA, WWCR #3 Nashville TN: Rutledge World Outreach. Rendall Rudledge.
1105 Australia, Radio: Lingua Franca. See A 0330.
1105 USA, WWCR #1 Nashville TN: Word of Wisdom. Howard Kirkwood evangelizes from Arkansas.
1110 USA, WWCR #1 Nashville TN: The View from Europe. Harvey Thomas presents the European point of view on current events.
1115 USA, WWCR #1 Nashville TN: Eco Watch. See S 2315.
1120 Australia, Radio: Book Reading. See A 0345.
1130 Australia, Radio: Fine Music Australia. See S 0210.
1130 Ecuador, HCJB Quito (am): We Kids. A fast-moving program for children.
1130 USA, WWCR #1 Nashville TN: World of Radio. See S 0230.

Frequencies

1200-1300	Anguilla,Caribbean Beacon	11775am			
1200-1300 vl	Australia, ABC/Alice Spgs	2310do			
1200-1300 vl	Australia, ABC/Katherine	2485do			
1200-1300 vl	Australia, ABC/Tent Creek	2325do			
1200-1300	Australia, Radio	5995pa	6020pa	9580va	11650va
		17750pa	21820as		
1200-1300 vl	Botswana, Radio	4820do	4830do	7255do	
1200-1300	Brazil, R Nacional Bras	15445am			
1200-1300	Bulgaria, Radio	15700eu	17500eu		
1200-1215	Cambodia, Natl Radio Of	11940as			
1200-1300 vl	Canada, CBC N Quebec Svc	9625do			
1200-1300	Canada, CFRX Toronto	6070do			
1200-1300	Canada, CFVP Calgary	6030do			
1200-1300	Canada, CHNX Halifax	6130do			
1200-1300	Canada, CKZN St John's	6160do			
1200-1300	Canada, CKZU Vancouver	6160do			
1200-1229	Canada, R Canada Intl	9660as	13650na	15195as	17765na
		17820na			
1200-1256	China, China Radio Intl	6950pa	7265pa	9715as	11660as
		11675pa	11980as		
1200-1230 vl	China, China Radio Intl	8660as	11700as	12110as	
1200-1300	Ecuador, HCJB	12005ca	15115am	21455va	
1200-1300	Eqt Guinea, Radio Africa	15186af			
1200-1300	France, Radio France Intl	11600as	15540af		
1200-1300	Germany, Deutsche Welle	6140eu			
1200-1300	Guyana, GBC/Voice of	5950do			
1200-1230	Iran, VOIRI	15430me	17560as	21510as	
1200-1300	Jordan, Radio	11690eu			
1200-1220 fa	Kazakhstan, R Almaty	9620eu	11840as		
1200-1300	Kenya, Kenya BC Corp	4935do			
1200-1230 s	Kyrgyzstan, Kyrgyz Radio	4010do	4050do		
1200-1300 vl	Lesotho, Radio	4800do			
1200-1300	Malaysia, Radio	7295do			
1200-1300 vl	Malaysia,RTM KotaKinabalu	5980do			
1200-1230	Mongolia, Voice of	12015au			
1200-1300	N Marianas, KFBS Saipan	11650as	15380as		
1200-1300	N Marianas, KHBI Saipan	9355as			
1200-1225	Netherlands, Radio	6045eu	9860eu		
1200-1300 occsnal	New Zealand, R NZ Intl	6100va			
1200-1300 vl	Nigeria, Radio/Ibadan	6050do			
1200-1300 vl	Nigeria, Radio/Kaduna	4770do			
1200-1300	Palau, KHBN/Voice of Hope	9955as	9965as	9985as	13840va
		15725as			
1200-1300 m-a/vl	Papua New Guinea, NBC	4890do			
1200-1300	Sierra Leone, SLBS	5980do			
1200-1300	Singapore,R Singapore Int	6015as	6150as		
1200-1300	Taiwan, Radio Taipei Intl	7130as	9610au		
1200-1300 as	Tanzania, Radio	5050af			
1200-1300	UK, BBC World Service	5965am	6190af	6195va	9410eu
	9515am 9580as	9740as	11760me	11940af	11955as
	12095eu 15220am	15280as	15310as	15485eu	15565eu
	15575me 17640eu	17705as	17830af	17885af	21660af
1200-1300	USA, KAIJ Dallas TX	5810na			
1200-1300	USA, KTBN Salt Lk City UT	7510na			
1200-1300	USA, KWHR Naalehu HI	9930as	11565pa		
1200-1300	USA, Voice of America	6160as	9355as	9645as	9760as
		11715as	15160as	15240as	15425as
1200-1300	USA, WEWN Birmingham AL	7425na	15745eu		
1200-1300	USA, WHRI Noblesville IN	6040na	9495am		
1200-1300	USA, WJCR Upton KY	7490na			
1200-1300 as	USA, WRMI/R Miami Intl	9955am			
1200-1300	USA, WRNO New Orleans LA	7395na			
1200-1300	USA, WSHB Cypress Crk SC	6095am	11660am		
1200-1300	USA, WWCR Nashville TN	5070na	5935na	7435na	12160na
1200-1245	USA, WYFR Okeechobee FL	5850eu	6015eu		
1200-1300	USA, WYFR Okeechobee FL	17750na			
1200-1230	Uzbekistan, R Tashkent	7285as	9715as	15295as	17775as
1200-1300	Zambia, Christian Voice	9865do			
1200-1300	Zambia, Natl BC Corp	6165do	6265do		
1200-1300 vl	Zimbabwe, Zimbabwe BC	4828do	5012do		
1204-1216 mtwhf	UK, BBC Caribbean Report	6195ca	15220ca		
1204-1216 as	UK, BBC World Service	15220am			
1215-1300	Egypt, Radio Cairo	17595as			
1220-1220 w	Kazakhstan, R Almaty	9620eu	11840as		
1229-1300	Canada, R Canada Intl	9640na	13650na	17765na	17820na
1230-1300	Austria, R Austria Intl	6155eu	13730na		
1230-1300	Bangladesh, Bangla Betar	7185as	9548as		
1230-1256	Belgium,R Vlaanderen Intl	5985eu			
1230-1300	Finland, YLE/R Finland	15400am	17670am		
1230-1300	Guam, AWR/KSDA	15330as			
1230-1300	Italy, AWR Europe	11800eu			
1230-1300	South Korea, R Korea Intl	9570as	9640om	13670as	
1230-1300	Sri Lanka, Sri Lanka BC	6005as	9730as	15425as	
1230-1300	Sweden, Radio	17895as	21810as		
1230-1300	Thailand, Radio	9655as	9885as	11905as	
1230-1257	Vietnam, Voice of	9840as	12020as		
1240-1300 t	Kazakhstan, R Almaty	9620eu	11840as		

Selected Programs

Sundays

1200 Australia, Radio: RA News. See S 0000.
1200 Ecuador, HCJB Quito (am): A Firm Foundation. Ken Smith with a biographical sketch of a notable personality.
1200 USA, WWCR #1 Nashville TN: Voice of Hope. Oliver Fenison.
1200 USA, WWCR #3 Nashville TN: USA Radio News. See S 0400.
1205 Australia, Radio: Country Club (Part 1). ABC's program of contemporary and traditional country music with Richard Porteous (1st Hour).
1205 Ecuador, HCJB Quito (am): Hour of Decision. Evangelist Billy Graham's radio program.
1205 USA, WWCR #3 Nashville TN: Inspirations Across America (hour 2). See S 1105.
1230 Ecuador, HCJB Quito (am): Words to Live By. What the Scriptures have to say when someone is disappointed with God.
1230 USA, WWCR #1 Nashville TN: Words of Hope. See S 1100.

Monday-Friday

1200 Australia, Radio: RA News. See S 0000.
1200 Ecuador, HCJB Quito (am): Morning in the Mountains. See M 1130.
1200 USA, WWCR #3 Nashville TN: The Overcomer Broadcast (live). Brother R. G. Stair preaches about the last days.
1255 Ecuador, HCJB Quito (am): The Gospel Truth. Miles McKee with a series of messages from Dublin, Ireland.

Mondays

1200 USA, WWCR #1 Nashville TN: New Harvest International. Dennis Deruz.
1205 Australia, Radio: Late Night Live. Topical, political, cultural and philosophical issues with Phillip Adams of Radio National.
1215 USA, WWCR #1 Nashville TN: Cross Talk. Lenny Meyer.
1230 USA, WWCR #1 Nashville TN: Victory Baptist Church (2/4). David Robinson preaches from Hildebrand, NC.
1245 USA, WWCR #1 Nashville TN: Walking Through the Land of Promises. Bobbie Lively evangelizes from Tennessee.

Tuesdays

1200 USA, WWCR #1 Nashville TN: The King is Coming. Steve Johnson evangelizes from the Faith Covenant Community Church of America in Florida.
1205 Australia, Radio: Late Night Live. See M 1205.
1215 USA, WWCR #1 Nashville TN: One Nation Under God. TJ Rodriguez.
1230 USA, WWCR #1 Nashville TN: World of Radio. See S 0230.

Wednesdays

1200 USA, WWCR #1 Nashville TN: Faith and Truth. Ken Megilligan.
1205 Australia, Radio: Late Night Live. See M 1205.
1215 USA, WWCR #1 Nashville TN: Faith Revival Ministries. Randolph Scott.
1230 USA, WWCR #1 Nashville TN: The Chapel Hour. Otis Tillman evangelizes from Buffalo, New York.

Thursdays

1200 USA, WWCR #1 Nashville TN: Abounding Grace. Gary Jones of the Charismatic Teaching Center near Orlando, Florida.
1205 Australia, Radio: Late Night Live. See M 1205.
1215 USA, WWCR #1 Nashville TN: Roberta Reads the Word. Roberta Lightfoot with 15 minutes of scripture reading.
1230 USA, WWCR #1 Nashville TN: Communications World ABC. See S 0200.

Fridays

1200 USA, WWCR #1 Nashville TN: Faith for Today. See W 1130.
1205 Australia, Radio: Sound Quality. Tim Ritchie of National Radio presents innovations in contemporary music.
1230 USA, WWCR #1 Nashville TN: Battle Cry Sounding. Deborah Green evangelizes from El Paso, Texas.

Saturdays

1200 Australia, Radio: RA News. See S 0000.
1200 Ecuador, HCJB Quito (am): A Visit With Mrs. G. Bible stories for children.
1200 USA, WWCR #1 Nashville TN: Bible Prophecy for Today. Tom Benvenutti analyzes the news and its application to Bible prophecy.
1200 USA, WWCR #3 Nashville TN: Rock the Universe. See A 0605.
1205 Australia, Radio: Spirit of Things. See S 0030.
1215 Ecuador, HCJB Quito (am): Adventure Pals. A weekly adventure program on Christianity for children.
1215 USA, WWCR #1 Nashville TN: New Horizons. See S 2315.
1230 Ecuador, HCJB Quito (am): Adventures in Odyssey. See T 0130.
1230 USA, WWCR #1 Nashville TN: Battle Cry Sounding. See F 1230.

Frequencies

1300-1400	Anguilla,Caribbean Beacon	11775am			
1300-1400 vl	Australia, ABC/Alice Spgs	2310do			
1300-1400 vl	Australia, ABC/Katherine	2485do			
1300-1400 vl	Australia, ABC/Tent Creek	2325do			
1300-1400	Australia, Radio	5995pa	6020pa	9580va	11650va
		17750pa	21820as		
1300-1400 vl	Botswana, Radio	4820do	4830do	7255do	
1300-1320	Brazil, R Nacional Bras	15445am			
1300-1400 vl	Canada, CBC N Quebec Svc	9625do			
1300-1400	Canada, CFRX Toronto	6070do			
1300-1400	Canada, CFVP Calgary	6030do			
1300-1400	Canada, CHNX Halifax	6130do			
1300-1400	Canada, CKZN St John's	6160do			
1300-1400	Canada, CKZU Vancouver	6160do			
1300-1400 mtwhf	Canada, R Canada Intl	17765na	17820na		
1300-1400 s	Canada, R Canada Intl	13650na	17800na		
1300-1400	China, China Radio Intl	7405na	11660va	11675pa	11900pa
		11980as	15180as		
1300-1329	Czech Rep, R Prague Intl	13580eu	17485as		
1300-1400	Ecuador, HCJB	12005ca	15115am	21455va	
1300-1330	Egypt, Radio Cairo	17595as			
1300-1400	Eqt Guinea, Radio Africa	15186af			
1300-1400	France, Radio France Intl	9805eu	15155eu	15195eu	
1300-1329	Germany, Deutsche Welle	6140eu			
1300-1400 a	Germany, Good News World	15330as			
1300-1400	Ghana, Ghana BC Corp	4915do	6130do		
1300-1400	Guyana, GBC/Voice of	5950do			
1300-1400	Jordan, Radio	11690eu			
1300-1400	Kenya, Kenya BC Corp	4935do			
1300-1400 vl	Lesotho, Radio	4800do			
1300-1310	Liberia,LCN/R Liberia Int	5100do			
1300-1400	Malaysia, Radio	7295do			
1300-1400 vl	Malaysia,RTM KotaKinabalu	5980do			
1300-1400	N Marianas, KFBS Saipan	9670as	11650as		
1300-1400	N Marianas, KHBI Saipan	9355as			
1300-1400 occsnal	New Zealand, R NZ Intl	6100va			
1300-1400 vl	Nigeria, Radio/Ibadan	6050do			
1300-1400 vl	Nigeria, Radio/Kaduna	4770do			
1300-1400	Palau, KHBN/Voice of Hope	9955as	9965as	9985as	13840va
		15725as			
1300-1400 vl	Papua New Guinea, NBC	4890do			
1300-1400	Philippines, FEBC R Intl	11995as			
1300-1400	Poland, Polish R Warsaw	6095eu	7270eu	9525eu	11820eu
1300-1356	Romania, R Romania Intl	9690eu	15390eu	15445eu	17720na
1300-1400 as	S Africa, Channel Africa	11720af	17860af	21530af	
1300-1400	Sierra Leone, SLBS	5980do			
1300-1400	Singapore,R Singapore Int	6015as	6150as		
1300-1330	South Korea, R Korea Intl	9570as	9640om	13670as	
1300-1400	Sri Lanka, Sri Lanka BC	6005as	9730as	15425as	
1300-1330	Switzerland, Swiss R Intl	15315eu			
1300-1400 as	Tanzania, Radio	5050af			
1300-1400	Uganda, Radio	4976do			
1300-1400	UK, BBC World Service	5965am	5990as	6190af	6195va
	9410eu 9515am	9740as	11760me	11940af	12095eu
	15220am 15310as	15420af	15485eu	15565eu	15575me
	17640eu 17705as	17830af	17885af	21660af	
1300-1400 a	UK, Merlin Network One	9750eu	12035eu	15235eu	
1300-1400	USA, KAIJ Dallas TX	5810na			
1300-1400	USA, KJES Vado NM	11715na			
1300-1400	USA, KNLS Anchor Point AK	9615as			
1300-1400	USA, KTBN Salt Lk City UT	7510na			
1300-1400	USA, KWHR Naalehu HI	9930as	11565pa		
1300-1400	USA, Voice of America	6160as	9355as	9645as	9760as
		11715as	15160as	15425as	
1300-1400	USA, WEWN Birmingham AL	11875na	15745eu		
1300-1400	USA, WHRI Noblesville IN	6040na	15105am		
1300-1400	USA, WJCR Upton KY	7490na			
1300-1400 s	USA, WRMI/R Miami Intl	9955am			
1300-1400	USA, WRNO New Orleans LA	7395na			
1300-1400	USA, WSHB Cypress Crk SC	9430na	9455am		
1300-1400	USA, WWCR Nashville TN	5070na	7435na	13845na	15685na
1300-1400	USA, WYFR Okeechobee FL	11830na	11970na	13695na	17750na
1300-1400	Zambia, Christian Voice	9865do			
1300-1400	Zambia, Natl BC Corp	6165do	6265do		
1300-1400 vl	Zimbabwe, Zimbabwe BC	4828do	5012do		
1315-1325 mtwhfa	Bhutan, Bhutan BC Service	5030do			
1325-1400	Germany, Voice of Hope	15715as			
1330-1400	Austria, R Austria Intl	13730am			
1330-1400	Canada, R Canada Intl	9535as	9640as	11795as	11935eu
		15325eu			
1330-1400	Guam, AWR/KSDA	11705as			
1330-1400	India, All India Radio	9545as	11620as	13710as	
1330-1400	Sweden, Radio	9435as	15240na	17505as	
1330-1400	Turkey, Voice of	15225eu	17560va		
1330-1400	UAE, Radio Dubai	13630eu	13675eu	15395eu	
1330-1400	Uzbekistan, R Tashkent	7285as	9715as	15295as	17775as
1330-1357	Vietnam, Voice of	9730eu	13740eu		
1345-1400	Vatican City, Vatican R	15500as	17550as		

Selected Programs

Sundays

1300 Australia, Radio: RA News. See S 0000.

1300 Ecuador, HCJB Quito (am): Weekend Magazine. A new program hosted by Steve Johnson.

1300 USA, WWCR #1 Nashville TN: Wings of Healing. Evelyn Wyatt directs this international broadcast from Los Angeles.

1300 USA, WWCR #3 Nashville TN: Answers for Life. Gospel music and a sermon by Pastor Hoover of Wichita, Kansas.

1305 Australia, Radio: Country Club (Part 2). ABC's program of contemporary and traditional country music with Richard Porteous (2nd Hour).

1330 Ecuador, HCJB Quito (am): Mountain Meditations. See S 0600.

1330 USA, WWCR #1 Nashville TN: Wayne Avenue Church of God. J.C. Wilber preaches from Columbus, Ohio.

Monday-Friday

1300 Australia, Radio: RA News. See S 0000.

1300 Ecuador, HCJB Quito (am): Precept with Kay Arthur. Kay Arthur offers a fresh approach to daily Bible study.

1300 USA, WWCR #1 Nashville TN: USA Radio News. See S 0400.

1300 USA, WWCR #3 Nashville TN: The Free American (live). Clay Douglas hosts the program that promotes America for Americans.

1305 Australia, Radio: The Planet (Part 1). Lucky Oceans plays richly varied music from around the world.

1305 USA, WWCR #1 Nashville TN: Pro Life Perspective. Anti-abortion message from the National Right-to-Life Committee.

1310 USA, WWCR #1 Nashville TN: Outdoor Tips. A short message about communing with nature.

1312 USA, WWCR #1 Nashville TN: Travel Tips/Bog Frog. S. Corvell/Water Foundation.

1313 Ecuador, HCJB Quito (am): Getting the Message. Two minutes of Bible interpretation.

1315 Ecuador, HCJB Quito (am): Proclaim!. Daily encouragement for godly living with Dr. Joseph Stowell, President of the Moody Bible Institute.

1315 USA, WWCR #1 Nashville TN: Joni and Friends. Joni Eareckson Tada presents help and advice especially for the disabled.

1320 USA, WWCR #1 Nashville TN: Messianic Minutes. Ted Simon presents five minutes of scriptural interpretation for Jewish listeners.

1325 USA, WWCR #1 Nashville TN: Life Issues. John Wilke on events affecting everyday living.

1328 Ecuador, HCJB Quito (am): Moments with The Word. See M 0200.

1330 Ecuador, HCJB Quito (am): Leading the Way. James Dobson of Focus on the Family.

1330 USA, WWCR #1 Nashville TN: Bible Pathway. Rick Hash with a five minute devotional commentary.

1335 USA, WWCR #1 Nashville TN: The Bright Spot Hour. Music and meditation by Harold Sightler of Greenville, South Carolina.

1356 Ecuador, HCJB Quito (am): Bibles for the World. See M 0200.

1358 Ecuador, HCJB Quito (am): The Bible Minute. It's actually two minutes.

1359 USA, WWCR #1 Nashville TN: The Nice Jewish Boy. Jonathan Cahn.

Saturdays

1300 Australia, Radio: Radio National News. News from the Australian Broadcasting Network (ABC).

1300 Ecuador, HCJB Quito (am): Children's Bible Hour. Songs and stories for children.

1300 USA, WWCR #1 Nashville TN: The Jesus Time Network. See M 0000.

1300 USA, WWCR #3 Nashville TN: Lyon Gold and Silver Magnet Program (repeat). See M 0430.

1305 Australia, Radio: Science Show. See T 0110.

1330 Ecuador, HCJB Quito (am): GodSeekers Central Station. A drama program for children.

1330 USA, WWCR #1 Nashville TN: The Hour of Reasoning. Pete Mobley preaches to his congregation in Oakland, California.

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Frequencies

1400-1500	Anguilla,Caribbean Beacon	11775am			
1400-1500 vl	Australia, ABC/Alice Spgs	2310do			
1400-1500 vl	Australia, ABC/Katherine	2485do			
1400-1500 vl	Australia, ABC/Tent Creek	2325do			
1400-1430	Australia, Radio	5995as	6180va	9580va	11650va
		17750pa			
1400-1500 vl	Botswana, Radio	4820do	4830do	7255do	
1400-1500 vl	Canada, CBC N Quebec Svc	9625do			
1400-1500	Canada, CFRX Toronto	6070do			
1400-1500	Canada, CFVP Calgary	6030do			
1400-1500	Canada, CHNX Halifax	6130do			
1400-1500	Canada, CKZN St John's	6160do			
1400-1500	Canada, CKZU Vancouver	6160do			
1400-1500 s	Canada, R Canada Intl	13650na	17800na		
1400-1457	China, China Radio Intl	7405na	11825as	13685as	15110af
		15125af			
1400-1500	Costa Rica,RF Peace Intl	21460am			
1400-1500	Ecuador, HCJB	12005ca	15115am	21455va	
1400-1500	Eqt Guinea, Radio Africa	15186af			
1400-1500	France, Radio France Intl	11955as	17680as		
1400-1500	Germany, RTE Radio	15625eu			
1400-1500	Germany, Voice of Hope	15715as			
1400-1500	Germany,Overcomer Ministr	6010eu			
1400-1415	Ghana, Ghana BC Corp	4915do	6130do		
1400-1500	Guyana, GBC/Voice of	5950do			
1400-1500	India, All India Radio	9545as	11620as	13710as	
1400-1500	Japan, Radio/NHK	9505na	11730as	11880me	
1400-1500	Jordan, Radio	11690eu			
1400-1500	Kenya, Kenya BC Corp	4935do			
1400-1500 vl	Lesotho, Radio	4800do			
1400-1500	Malaysia, Radio	7295do			
1400-1500	Malaysia, RTM Sarawak	7160do			
1400-1500 vl	Malaysia,RTM KotaKinabalu	5980do			
1400-1500	N Marianas, KFBS Saipan	9465as	9495as	9670as	
1400-1500 occsnal	New Zealand, R NZ Intl	6100va			
1400-1500 vl	Nigeria, Radio/Ibadan	6050do			
1400-1500 vl	Nigeria, Radio/Kaduna	4770do			
1400-1415	Pakistan, Radio	9645do			
1400-1500	Palau, KHBN/Voice of Hope	9955as	9965as	9985as	13840va
		15725as			
1400-1500 vl	Papua New Guinea, NBC	4890do			
1400-1500	Philippines, FEBC R Intl	11995as			
1400-1455 as	S Africa, Channel Africa	11720af	17860af	21530af	
1400-1500	Sierra Leone, SLBS	5980do			
1400-1500	Singapore,RCorp Singapore	6150do			
1400-1500	Sri Lanka, Sri Lanka BC	6005as	9730as	15425as	
1400-1500	Switzerland, Swiss R Intl	9575as	17670as		
1400-1500	Taiwan, Radio Taipei Intl	15125as			
1400-1500 as	Tanzania, Radio	5050af			
1400-1430	Thailand, Radio	9580as	9655as	11905as	
1400-1425	Turkey, Voice of	15225eu	17560as		
1400-1500	Uganda, Radio	4976do			
1400-1500	UK, BBC World Service	3990as	6190af	6195as	9515am
	9740as	11865am	11940af	12095eu	15220am
	15310as	15485eu	15565eu	15575ma	17640eu
	17705as	17830af	17840am	21470af	21660af
1400-1500 a	UK, Merlin Network One	9750eu	12035eu	15235eu	
1400-1500	USA, KAIJ Dallas TX	13815na			
1400-1500	USA, KJES Vado NM	11715na			
1400-1500	USA, KTBN Salt Lk City UT	7510na			
1400-1500	USA, KWHR Naalehu HI	9930as	11565pa		
1400-1500	USA, Voice of America	6160as	7125as	7215as	9645as
	9760as	15160as	15255va	15395as	15425as
1400-1500	USA, WEWN Birmingham AL	11875na	15745eu		
1400-1500	USA, WGTG McCaysville GA	9370al	9400am		
1400-1500	USA, WHRI Noblesville IN	6040na	15105am		
1400-1500	USA, WJCR Upton KY	7490na			
1400-1500 irreg	USA, WMLK Bethel PA	9465am			
1400-1500 s	USA, WRMI/R Miami Intl	9955am			
1400-1500	USA, WRNO New Orleans LA	7395na			
1400-1500	USA, WWCR Nashville TN	9475na	12160na	13845na	15685na
1400-1500	USA, WYFR Okeechobee FL	11830na	11970na	17750na	
1400-1405	Vatican City, Vatican R	15500as	17550as		
1400-1500	Zambia, Christian Voice	9865do			
1400-1500	Zambia, Natl BC Corp	6165do	6265do		
1400-1500 vl	Zimbabwe, Zimbabwe BC	4828do	5012do		
1410-1420	Greece, Voice of	9425eu	15630eu		
1415-1420	Nepal, Radio	5005as	7165as		
1430-1500	Australia, Radio	5995as	6180va	9500as	9580va
		11650va	11660as	17750pa	
1430-1500 vl	China, China Radio Intl	8660as			
1430-1500	Guam, AWR/KSDA	11980as			
1430-1500	Guam, TWR/KTWR	15330as			
1430-1500	Netherlands, Radio	9890as	12075as	15590as	
1430-1500	S Africa, RTE Radio	21745af			
1430-1500	Slovakia, AWR Europe	17525as			

Selected Programs

Sundays

1400 Australia, Radio: RA News. See S 0000.
1400 Ecuador, HCJB Quito (am): Simply Worship. A Northern Ireland program of music, readings and meditation.
1400 USA, WWCR #3 Nashville TN: Harvestfire. Clarence McClendon preaches from the Church of the Harvest in Los Angeles.
1405 Australia, Radio: Books and Writing. Ramona Koval conducts in-depth interviews with writers and analyzes their work.
1430 Ecuador, HCJB Quito (am): Moody Presents. Christian messages from the Moody Bible Institute.
1430 USA, WWCR #1 Nashville TN: A Temple of Jesus Christ. Cleveland Waters preaches from Philadelphia.

Monday-Friday

1400 Australia, Radio: RA News. See S 0000.
1400 Ecuador, HCJB Quito (am): Turning Point. David Jeremiah with a "common sense" approach to current issues.
1400 USA, WWCR #1 Nashville TN: The Nice Jewish Boy. See M 1359.
1400 USA, WWCR #3 Nashville TN: USA Radio News. See S 0400.
1402 USA, WWCR #1 Nashville TN: The Grace Hour (live). Carl Stevens of Baltimore answers listener questions about religion.
1405 Australia, Radio: The Planet (Part 2). See M 1305.
1405 USA, WWCR #3 Nashville TN: Freedom Calls (live). See M 0605.
1430 Ecuador, HCJB Quito (am): The Living Way. Jack Hayford preaches from The Church on the Way in Van Nuys, California.
1456 Ecuador, HCJB Quito (am): Beyond the Call. Real questions and real answers on Christian living with Dr. Ron Cline, HCJB World Radio President.
1458 Ecuador, HCJB Quito (am): Parent Talk Tip. Randy Carlson and Dr. Kevin Leman with advice for child-rearing.

Thursday

1430 BBC London (AS): Assignment. See H 1130.

Saturdays

1400 Australia, Radio: RA News. See S 0000.
1400 Ecuador, HCJB Quito (am): Kids' Corner. Mr Lizard and friends present a program for children.
1400 USA, WWCR #1 Nashville TN: The Infalible Truth. John Standifer.
1400 USA, WWCR #3 Nashville TN: USA Radio News. See S 0400.
1405 Australia, Radio: New Dimensions. No program - no information available.
1405 USA, WWCR #3 Nashville TN: Travel Smart (live). Jaqueline Wolfer offers tips and ideas for traveling safely and economically.
1430 Ecuador, HCJB Quito (am): Alive!. See S 0300.
1430 USA, WWCR #1 Nashville TN: Sonrise. Larry Reichardt evangelizes.

Thank You...

Additional contributors to this month's Shortwave Guide:

Benelux; *British DX Club*; Bob Fraser, Cohasset, MA; Ivan Gushin, Ont Canada; Glenn Hauser, Enid, OK/*World of Radio, DX Report, REVIEW OF INT'L BROADCASTERS,* Hans Johnson/Ulis Fleming/*Cumbre DX/DXing With Cumbre*; Robert Montgomery, USA; Al Quaglieri/*NASWA Journal;* Bob Padula, Victoria, Australia, *EDXP*; Giovanni Serra/*The Four Winds*; BBCM; *BBC On-Air; DX Ontario; Gatflash!; Hard Core DX* ; *New Zealand DX Times; Nordic SW Center*; Radio Netherlands/*Media Network*; Radio Sweden/*Media Scan*; Usenet Newsgroups; *World Wide DX Club*.

Frequencies

1500-1600	Anguilla,Caribbean Beacon	11775am			
1500-1600 vl	Australia, ABC/Alice Spgs	2310do			
1500-1600 vl	Australia, ABC/Katherine	2485do			
1500-1600 vl	Australia, ABC/Tent Creek	2325do			
1500-1600	Australia, Radio	5995as	6180va	9500as	9580va
		11650va	11660as	17750pa	
1500-1600 vl	Botswana, Radio	4820do	4830do	7255do	
1500-1600 vl	Canada, CBC N Quebec Svc	9625do			
1500-1600	Canada, CFRX Toronto	6070do			
1500-1600	Canada, CFVP Calgary	6030do			
1500-1600	Canada, CHNX Halifax	6130do			
1500-1600	Canada, CKZN St John's	6160do			
1500-1600	Canada, CKZU Vancouver	6160do			
1500-1600 s	Canada, R Canada Intl	13650na	17800na		
1500-1556	China, China Radio Intl	7160as	9785as	13685as	15125af
1500-1600	Costa Rica,RF Peace Intl	15050am	21460am		
1500-1600	Ecuador, HCJB	12005ca	15115am	21455va	
1500-1600	Eqt Guinea, Radio Africa	15186af			
1500-1600	Germany, Voice of Hope	15715as			
1500-1600	Guyana, GBC/Voice of	5950do			
1500-1530	Israel, Kol Israel	15650va	17535va		
1500-1600	Japan, Radio/NHK	7200as	9505na	9750as	11730as
1500-1600	Jordan, Radio	11690eu			
1500-1600	Kenya, Kenya BC Corp	4935do			
1500-1600 vl	Lesotho, Radio	4800do			
1500-1510	Liberia,LCN/R Liberia Int	5100do			
1500-1600	Malaysia, Radio	7295do			
1500-1600	Malaysia, RTM Sarawak	7160do			
1500-1600 vl	Malaysia,RTM KotaKinabalu	5980do			
1500-1530	Mexico, Radio Mexico Intl	9705am			
1500-1530	Mongolia, Voice of	9720as	12015as		
1500-1600	Myanmar, Radio	5986do			
1500-1600	N Marianas, KFBS Saipan	9465as	9495as	9670as	
1500-1600	Netherlands, Radio	9890as	12075as	15590as	
1500-1600 occsnal	New Zealand, R NZ Intl	6145va			
1500-1600 vl	Nigeria, Radio/Ibadan	6050do			
1500-1600 vl	Nigeria, Radio/Kaduna	4770do			
1500-1600 vl	Nigeria, Voice of	7255af	15120va		
1500-1600	North Korea, R Pyongyang	3560eu	9640as	9975me	11335am
		11735am	13650va		
1500-1600	Palau, KHBN/Voice of Hope	9955as	9965as	9985as	15725as
1500-1600 vl	Papua New Guinea, NBC	4890do			
1500-1600	Russia,Voice of Russia WS	12005as	12025as	15550as	
1500-1530	S Africa, Channel Africa	17770af			
1500-1600	Seychelles, FEBA Radio	11600as			
1500-1600	Sierra Leone, SLBS	5980do			
1500-1600	Singapore,RCorp Singapore	6150do			
1500-1600	Sri Lanka, Sri Lanka BC	6005as	9730as	15425as	
1500-1600 as	Tanzania, Radio	5050af			
1500-1600	Uganda, Radio	4976do			
1500-1600	UK, BBC World Service	5975as	5990as	6190af	6195as
	9410eu 9515am	9740as	11860af	11940af	12095eu
	15220am 15310as	15400af	15420af	15485eu	15575eu
	17705as 17830af	17840am	21470af	21490af	21660af
1500-1600 a	UK, Merlin Network One	9750eu	12035eu	15235eu	
1500-1600	USA, KAIJ Dallas TX	13815na			
1500-1600	USA, KTBN Salt Lk City UT	15590na			
1500-1600	USA, KWHR Naalehu HI	9930as	11565pa		
1500-1600	USA, Voice of America	7125as	7215as	9645as	9700me
		15205va	15255va	15395as	
1500-1600	USA, WEWN Birmingham AL	11875na	15745eu		
1500-1600	USA, WGTG McCaysville GA	9370al	9400am		
1500-1600	USA, WHRI Noblesville IN	13760na	15105sa		
1500-1600	USA, WJCR Upton KY	7490na			
1500-1600 irreg	USA, WMLK Bethel PA	9465am			
1500-1600 s	USA, WRMI/R Miami Intl	9955am			
1500-1600	USA, WRNO New Orleans LA	7395na			
1500-1600	USA, WWCR Nashville TN	9475na	12160na	13845na	15685na
1500-1600	USA, WYFR Okeechobee FL	11830na	17750na		
1500-1600	Zambia, Christian Voice	9865do			
1500-1600	Zambia, Natl BC Corp	6165do	6265do		
1500-1600 vl	Zimbabwe, Zimbabwe BC	4828do	5012do		
1515-1600	Seychelles, FEBA Radio	11695as			
1530-1540	Bangladesh, Bangla Betar	4880as	15520as		
1530-1600	Guam, AWR/KSDA	9355as	11920as		
1530-1600	Iran, VOIRI	7250as	11680as	13605as	15150as
1530-1600	Tanzania, Radio	5050af			
1545-1600 sh	Bangladesh, Bangla Betar	4880as	15520as		
1545-1600 m	Guam, TWR/KTWR	15330as			
1550-1600 a	Vatican City, Vatican R	12065om	13765au	15500au	

Selected Programs

Sundays

1500 Australia, Radio: RA News. See S 0000.
1500 Ecuador, HCJB Quito (am): Encounter. Expository biblical preaching by Stephen Olford.
1500 USA, WWCR #1 Nashville TN: Prophetic Word Program. A message of salvation from Dan Kubish of the House of Yaweh.
1500 USA, WWCR #3 Nashville TN: The Whole Truth. Anthonee Patterson conducts services from Pennsylvania.
1505 Australia, Radio: Encounter. This highly acclaimed Radio National series explores the connections between religion and life.
1530 Ecuador, HCJB Quito (am): Back to God Hour. David Fettis of The Christian Reformed Church looks at life in light of the historic Christian faith.
1530 USA, WWCR #1 Nashville TN: Cross Roads Baptist Church. Lloyd Ferguson preaches from Lawrenceville, Georgia.
1555 Australia, Radio: On This Day. Anniversaries worth remembering.

Monday-Friday

1500 Australia, Radio: RA News. See S 0000.
1500 Ecuador, HCJB Quito (am): Back to the Bible. A mix of music and daily Bible study.
1500 USA, WWCR #1 Nashville TN: The End Time Evangel. Jack Frost.
1500 USA, WWCR #3 Nashville TN: USA Radio News. See S 0400.
1505 Australia, Radio: Asia Pacific. See M 1105.
1506 USA, WWCR #3 Nashville TN: Freedom Calls (live). See M 0605.
1515 USA, WWCR #1 Nashville TN: The Living Waters Broadcast. Father Bob Guste evangelizes from Louisiana.
1525 Ecuador, HCJB Quito (am): Joni and Friends. Joni Erickson-Tada presents help and advice especially for the disabled.
1530 Ecuador, HCJB Quito (am): Gateway to Joy. Elizabeth Elliot with contemporary women's issues from a Biblical perspective.
1530 USA, WWCR #1 Nashville TN: The Time of Deliverance. Benjamin Smith preaches from the Time of Deliverance Evangelistic Church in Philadelphia.
1544 Ecuador, HCJB Quito (am): Key Life. Steve Brown presents truthful teachings.
1545 USA, WWCR #1 Nashville TN: Focus on the Kingdom. Anthony Buzzard.
1557 Ecuador, HCJB Quito (am): LifePoints. See M 0200.

Mondays

1530 Australia, Radio: The Health Report. A program that examines health issues and makes complex scientific data understandable.

Tuesdays

1530 Australia, Radio: The Law Report. See T 0030.

Wednesdays

1530 Australia, Radio: The Religion Report. See W 0030.

Thursdays

1530 Australia, Radio: Media Report. See H 0030.

Fridays

1530 Australia, Radio: The Sports Factor. See F 0030.

Saturdays

1500 Australia, Radio: RA News. See S 0000.
1500 Ecuador, HCJB Quito (am): Alive!. See S 0300.
1500 USA, WWCR #1 Nashville TN: Let the Bible Speak. James Hickey with a program from New Testament Christianity in Oklahoma.
1500 USA, WWCR #3 Nashville TN: The Free American (live). See M 1300.
1505 Australia, Radio: Melisma (Part 1). Musical revelations (1st hour).
1530 Ecuador, HCJB Quito (am): Songtime Weekend. Evangelical teachings and music from Boston.
1530 USA, WWCR #1 Nashville TN: The Showers of Blessings Broadcast. Ed McAbee sermonizes before a live congregation.
1545 USA, WWCR #1 Nashville TN: Words of Hope. See S 1100.

Hauser's Highlights

CROATIA: Croatian Radio

For B99, effective Oct 31, the tentative planned schedule via Jülich is:

UT	kHz	Target
0000-0200	9925	SAm 230 deg
0200-0400	9925	NAm(E) 300 deg (7280 alternative) [ham band!! gh]
0400-0600	9925	NAm(W) 325 deg (7285 alternative) [ham band!! gh]
0600-0800	11880	NZ 230 deg (13820 alternative)
0800-1000	13820	Australia 270 deg
2100-2200	11605	Af/NE 160 deg

(Bob Padula, *Electronic DX Press*)

Frequencies

1600-1700	Algeria, R Algiers Intl	11715af	15160me		
1600-1700	Anguilla,Caribbean Beacon	11775am			
1600-1700 vl	Australia, ABC/Alice Spgs	2310do			
1600-1700 vl	Australia, ABC/Katherine	2485do			
1600-1700 vl	Australia, ABC/Tent Creek	2325do			
1600-1700	Australia, Radio	5995as	6180va	9500as	9580va
		11650va	11660as	17750pa	
1600-1700 vl	Botswana, Radio	4820do	4830do	7255do	
1600-1700 vl	Canada, CBC N Quebec Svc	9625do			
1600-1700	Canada, CFRX Toronto	6070do			
1600-1700	Canada, CFVP Calgary	6030do			
1600-1700	Canada, CHNX Halifax	6130do			
1600-1700	Canada, CKZN St John's	6160do			
1600-1700	Canada, CKZU Vancouver	6160do			
1600-1656	China, China Radio Intl	9565af	9870af		
1600-1700	Costa Rica,RF Peace Intl	15050am	21460am		
1600-1627	Czech Rep, R Prague Intl	5930eu	21745af		
1600-1630	Ecuador, HCJB	12005ca	15115am	21455va	
1600-1700	Eqt Guinea, Radio Africa	15186af			
1600-1700	Ethiopia, Radio	7165af	9560af		
1600-1700	France, Radio France Intl	11615af	11995af	12015af	15210af
		17605af			
1600-1645	Germany, Deutsche Welle	6140eu	6170as	7225as	9735af
	9875as	11810af	15135af	17595as	21695af
1600-1700 s	Germany, Good News World	15105va			
1600-1630 s	Germany, Universal Life	15105af			
1600-1630	Germany, Voice of Hope	15715as			
1600-1700	Guam, AWR/KSDA	9355as	11920as		
1600-1630 as	Guam, TWR/KTWR	15330as			
1600-1700	Guyana, GBC/Voice of	5950do			
1600-1630	Iran, VOIRI	7250as	11680as	13605as	15150as
1600-1700	Jordan, Radio	11690eu			
1600-1700	Kenya, Kenya BC Corp	4935do			
1600-1700 vl	Lesotho, Radio	4800do			
1600-1700	Malaysia, Radio	7295do			
1600-1630	Mexico, Radio Mexico Intl	9705am			
1600-1700	N Marianas, KFBS Saipan	9465as	9495as		
1600-1625	Netherlands, Radio	9890as	12075as	15590as	
1600-1650 occsnal	New Zealand, R NZ Intl	6145va			
1600-1700 vl	Nigeria, Radio/Ibadan	6050do			
1600-1700 vl	Nigeria, Radio/Kaduna	4770do			
1600-1700	Nigeria, Voice of	7255af	15120va		
1600-1630	Pakistan, Radio	7230do	11570me	15319af	15465me
		17511me	17719af		
1600-1700	Palau, KHBN/Voice of Hope	9955as	9965as		
1600-1700 vl	Papua New Guinea, NBC	4890do			
1600-1700	Russia,Voice of Russia WS	4730me	4940me	4975me	7325me
		9480eu	9730eu	11500as	12070me
1600-1630	S Africa, Channel Africa	6150af			
1600-1629	Seychelles, FEBA Radio	11695as			
1600-1700	Sierra Leone, SLBS	5980do			
1600-1700	South Korea, R Korea Intl	5975om	9515af	9870af	
1600-1700	Swaziland, Trans World R	9500af			
1600-1615	Switzerland, Swiss R Intl	9575as	17670as		
1600-1700	Tanzania, Radio	5050af			
1600-1645	UAE, Radio Dubai	13630eu	13675eu	15395eu	21605eu
1600-1700	Uganda, Radio	4976do			
1600-1700	UK, BBC World Service	3915as	5975as	5990as	6190af
	6195as 7160as	9410eu	9515am	9740as	11940af
	12095eu 15310as	15400af	15485eu	15575am	17705as
	17830af 17840am	21470af	21660af		
1600-1700 mtwhf	UK, Merlin Network One	6175eu			
1600-1700 a	UK, Merlin Network One	9750eu	12035eu	15235eu	
1600-1700	USA, KAIJ Dallas TX	13815na			
1600-1700	USA, KTBN Salt Lk City UT	15590na			
1600-1700	USA, KWHR Naalehu HI	9930as			
1600-1700	USA, Voice of America	6035af	6110as	6160as	7125as
	7215as 9645as	9700as	9760as	13710af	15205va
	15225af 15255va	15395as	15410af		
1600-1700	USA, WEWN Birmingham AL	11875na	13615na		
1600-1700	USA, WGTG McCaysville GA	9370al	9400am		
1600-1700	USA, WHRA Greenbush ME	17650af			
1600-1700	USA, WHRI Noblesville IN	13760na	15105sa		
1600-1700	USA, WINB Red Lion PA	13800am			
1600-1700	USA, WJCR Upton KY	7490na			
1600-1700 s	USA, WRMI/R Miami Intl	9955am			
1600-1700	USA, WRNO New Orleans LA	7395na			
1600-1700	USA, WSHB Cypress Crk SC	18915af			
1600-1700	USA, WWCR Nashville TN	9475na	12160na	13845na	15685na
1600-1700	USA, WYFR Okeechobee FL	11830na	15695eu	17555eu	17750na
		21525va			
1600-1615 a	Vatican City, Vatican R	12065om	13765au	15500au	
1600-1630	Vietnam, Voice of	9730eu	13740eu		
1600-1700	Zambia, Christian Voice	4965do			
1600-1700	Zambia, Natl BC Corp	6165do	6265do		
1600-1630 vl	Zimbabwe, Zimbabwe BC	4828do	5012do		
1604-1700	USA, WYFR Okeechobee FL	15600na			
1615-1700 a	UK, BBC World Service	9515am	11860af		
1615-1700 a	UK, BBC World Service	9515am			
1630-1700	Austria, R Austria Intl	6155va	13730va	15240va	17560va
1630-1657	Canada, R Canada Intl	6140as	7150as		
1630-1700	Egypt, Radio Cairo	15255af			
1630-1700	Georgia, Georgian Radio	6180me			
1630-1700 sf	Seychelles, FEBA Radio	11695as			
1630-1700 vl	Zimbabwe, Zimbabwe BC	3306do	4828do		
1645-1700	Germany, Deutsche Welle	6140eu			
1645-1700	Tajikistan, Radio	7245as			
1645-1700 smwf	UK, BBC World Service	11860af			
1650-1700 twhfa	New Zealand, R NZ Intl	11675va			

Selected Programs

Sundays

1600 Australia, Radio: RA News. See S 0000.
1600 Ecuador, HCJB Quito (am): Message of Truth. See S 0630.
1600 USA, WINB Red Lion PA: Apostolic Witness.
1600 USA, WWCR #1 Nashville TN: Latin Catholic Mass. Father Gommar De Pauw conducts the traditional Latin Mass.
1600 USA, WWCR #3 Nashville TN: Apostolic Assembly. Lonnie Wollard preaches from Milltown, Connecticut.
1605 Australia, Radio: The National Interest. Terry Lane takes an incisive look at the week's major events.
1630 USA, WINB Red Lion PA: Divine Plan.
1630 USA, WWCR #1 Nashville TN: Blessed Assurance Ministry. Edward Maloof conducts services from Massachusetts.
1645 USA, WINB Red Lion PA: Staff of Life Ministries.

Monday-Friday

1600 Australia, Radio: RA News. See S 0000.
1600 Ecuador, HCJB Quito (am): Haven. Evangelizing and The Haven Quartet.
1600 USA, WINB Red Lion PA: The Apocalypse Chronicles.
1600 USA, WWCR #1 Nashville TN: World Wide Country Radio (live). News, weather and the best of country music.
1600 USA, WWCR #3 Nashville TN: USA Radio News. See S 0400.
1626 Ecuador, HCJB Quito (am): Heart of the Matter. See M 0200.
1628 Ecuador, HCJB Quito (am): Life Jewels. See M 0200.

Mondays

1603 USA, WWCR #3 Nashville TN: Scriptures for America (live). Peter J. Peters hosts this outreach ministry of the LaPorte Church of Christ in Colorado.
1605 Australia, Radio: Music Deli. Paul Petran present music from a variety of cultures.

Tuesdays

1603 USA, WWCR #3 Nashville TN: Scriptures for America (live). See M 1603.
1605 Australia, Radio: The Comfort Zone. Architecture and design, gardens, food and travel with Alan Saunders.

Wednesdays

1603 USA, WWCR #3 Nashville TN: Scriptures for America (live). See M 1603.
1605 Australia, Radio: Verbatim. New program--no information available.
1630 Australia, Radio: Earshot. See W 1605.

Thursdays

1603 USA, WWCR #3 Nashville TN: Scriptures for America (live). See M 1603.
1605 Australia, Radio: Hindsight. Michelle Rayner presents current events from an historical perspective.
1615 UK, BBC London (AS): Paul McCartney's Routes of Rock (17th,24th). See W 0530.

Fridays

1603 USA, WWCR #3 Nashville TN: Health Programming (live). Various hosts.
1605 Australia, Radio: Awaye!. See M 0110.

Saturdays

1600 Australia, Radio: RA News. See S 0000.
1600 Ecuador, HCJB Quito (am): Words of Hope. David Bass provides the message.
1600 USA, WINB Red Lion PA: Life Quest.
1600 USA, WWCR #1 Nashville TN: A Brighter Day. Jane Rogowski evangelizes from Maryland.
1600 USA, WWCR #3 Nashville TN: Strength for Today. Lane Brown.
1605 Australia, Radio: Melisma (Part 2). Musical revelations (2nd hour).
1615 USA, WINB Red Lion PA: The Sower.
1615 USA, WWCR #1 Nashville TN: Ask WWCR. See M 0430.
1630 USA, WINB Red Lion PA: Sound of Life Radio.
1630 USA, WWCR #1 Nashville TN: The Word of Victory. Joyce Corbitt preaches from Great Britain.
1630 USA, WWCR #3 Nashville TN: The Baptist Hour. A half-hour of sermon and song from Fort Worth, Texas.
1645 USA, WWCR #1 Nashville TN: Hope for Today. J. Otis Yoder of Pennsylvania with a spiritual message.

Frequencies

1700-1800	Anguilla,Caribbean Beacon	11775am			
1700-1800 vl	Australia, ABC/Alice Spgs	2310do			
1700-1800 vl	Australia, ABC/Katherine	2485do			
1700-1800 vl	Australia, ABC/Tent Creek	2325do			
1700-1800	Australia, Radio	5995as	6180va	9500as	9580va
		9660va	11880va		
1700-1800 vl	Botswana, Radio	4820do	4830do	7255do	
1700-1800 vl	Canada, CBC N Quebec Svc	9625do			
1700-1800	Canada, CFRX Toronto	6070do			
1700-1800	Canada, CFVP Calgary	6030do			
1700-1800	Canada, CHNX Halifax	6130do			
1700-1800	Canada, CKZN St John's	6160do			
1700-1800	Canada, CKZU Vancouver	6160do			
1700-1756	China, China Radio Intl	5220af	7405af	9570af	9745af
		11910af	15300af	15310af	
1700-1800	Costa Rica,RF Peace Intl	15050am	21460am		
1700-1727	Czech Rep, R Prague Intl	5930eu	21745af		
1700-1800	Egypt, Radio Cairo	15255af			
1700-1800	Eqt Guinea, Radio Africa	15186af			
1700-1730	France, Radio France Intl	15210af	17605af		
1700-1800	Germany, Deutsche Welle	6140eu			
1700-1800 a	Germany, Good News World	11795va			
1700-1800	Germany,Overcomer Ministr	3965eu			
1700-1800	Ghana, Ghana BC Corp	3366do	4915do		
1700-1800	Guyana, GBC/Voice of	5950do			
1700-1800 vl	Italy, IRRS	3985va			
1700-1800	Japan, Radio/NHK	7110eu	9535na	9825as	15355af
1700-1730	Jordan, Radio	11690eu			
1700-1800	Kenya, Kenya BC Corp	4935do			
1700-1800 vl	Lesotho, Radio	4800do			
1700-1800	Malaysia, Radio	7295do			
1700-1800	N Marianas, KFBS Saipan	9465as			
1700-1800 twhfa	New Zealand, R NZ Intl	11675va			
1700-1800 vl	Nigeria, Radio/Ibadan	6070do			
1700-1800 vl	Nigeria, Radio/Kaduna	4770do			
1700-1800	Nigeria, Radio/Lagos	3326do			
1700-1730 t	Pakistan, Radio	11600me	13580me		
1700-1800	Palau, KHBN/Voice of Hope	9955as	9965as		
1700-1800 vl	Papua New Guinea, NBC	4890do			
1700-1756	Romania, R Romania Intl	15270eu	15380eu	17735eu	17865eu
1700-1800	Russia,Voice of Russia WS	9675me	9730eu	12005as	12070me
1700-1730	S Africa, Channel Africa	17860af			
1700-1800	Sierra Leone, SLBS	5980do			
1700-1800	Tanzania, Radio	5050af			
1700-1800	Uganda, Radio	4976do			
1700-1800	UK, BBC World Service	3255af	3915as	5975as	6005af
	6190af 7160as	9410eu	9510as	9630af	9740as
	11995me 12095eu	15400af	15420af	15485eu	17830af
	17840am				
1700-1800	USA, KAIJ Dallas TX	13815na			
1700-1800	USA, KTBN Salt Lk City UT	15590na			
1700-1800	USA, KWHR Naalehu HI	9930as			
1700-1800	USA, Voice of America	6110as	6190as	7125as	7170as
		9645as	9700me	9760af	15255va
		15395as	15410af	15445af	17895af
1700-1800 mtwhf	USA, Voice of America	5990as	6045as	7150as	9550as
		9770as	11870as		
1700-1800	USA, WEWN Birmingham AL	11875na	13615na		
1700-1800	USA, WGTG McCaysville GA	9370al	9400am		
1700-1800	USA, WHRA Greenbush ME	17650af			
1700-1800	USA, WHRI Noblesville IN	13760na	15105na		
1700-1800	USA, WINB Red Lion PA	13800am			
1700-1800	USA, WJCR Upton KY	7490na			
1700-1800 irreg	USA, WMLK Bethel PA	9465am			
1700-1800	USA, WRNO New Orleans LA	7395na			
1700-1800	USA, WSHB Cypress Crk SC	18915af			
1700-1800	USA, WWCR Nashville TN	9475na	12160na	13845na	15685na
1700-1800	USA, WYFR Okeechobee FL	15695eu	17555eu		
1700-1727	Vietnam, Voice of	12070eu			
1700-1800	Zambia, Christian Voice	4965do			
1700-1800	Zambia, Natl BC Corp	6165do	6265do		
1700-1800 vl	Zimbabwe, Zimbabwe BC	3306do	4828do		
1715-1800 vl	Libya, Voice of Africa	15235va	15415va	15435va	
1715-1800	Swaziland, Trans World R	3200af			
1715-1730	Vatican City, Vatican R	4005eu	5883eu	7250eu	9645eu
		15595eu			
1730-1800	Guam, AWR/KSDA	11560as	11965as		
1730-1800	Netherlands, Radio	6020af	7120af	11655af	
1730-1800	Philippines, R Pilipinas	11720as	15190as	17720as	
1730-1800	S Africa, AWR Africa	12130af			
1730-1800	Slovakia, R Slovakia Intl	5920eu	6055eu	7345eu	
1730-1800 mtwhfa	Sweden, Radio	6065eu			
1730-1800 s	Sweden, Radio	6065eu	9590eu		
1730-1800 s	UK, BBC World Service	12045as	15310as		
1730-1800	Vatican City, Vatican R	13765af	15570af	17550af	
1745-1800	Bangladesh, Bangla Betar	7185eu	7462eu	9548eu	15520eu
1745-1800	India, All India Radio	3315do	3345do	7410af	9635af
		9950eu	11620eu	11935af	13780af
		15200af			
1800-1900	Anguilla,Caribbean Beacon	11775am			
1800-1900 mtwhf	Argentina, RAE	15345eu			
1800-1900 vl	Australia, ABC/Alice Spgs	2310do			
1800-1900 vl	Australia, ABC/Katherine	2485do			
1800-1900 vl	Australia, ABC/Tent Creek	2325do			
1800-1900	Australia, Radio	6080pa	7240va	9500as	9580va
		9660va	11880va		
1800-1900	Bangladesh, Bangla Betar	7185eu	7462eu	9548eu	15520eu
1800-1900 vl	Botswana, Radio	4820do	4830do		
1800-1900	Canada, CFRX Toronto	6070do			
1800-1900	Canada, CFVP Calgary	6030do			
1800-1900	Canada, CHNX Halifax	6130do			
1800-1900	Canada, CKZN St John's	6160do			
1800-1900	Canada, CKZU Vancouver	6160do			
1800-1900	Costa Rica,RF Peace Intl	15050am	21460am		
1800-1830	Egypt, Radio Cairo	15255af			
1800-1900	Eqt Guinea, Radio Africa	15186af			
1800-1830	Georgia, Georgian Radio	11910eu			
1800-1900	Germany, Deutsche Welle	6140eu			
1800-1900	Germany,Overcomer Ministr	3965eu			
1800-1830	Ghana, Ghana BC Corp	3366do	4915do		
1800-1815	Greece, Voice of	7450eu	9425eu	17705na	17765sa
1800-1900	Guyana, GBC/Voice of	5950do			
1800-1900	India, All India Radio	7410af	9950eu	11620eu	13780af
		15075af			
1800-1900 vl	Italy, IRRS	3985va			
1800-1900	Kenya, Kenya BC Corp	4935do			
1800-1900	Kuwait, Radio	11990am			
1800-1900	Lebanon, Voice of Hope	6280me	11515al	11530me	
1800-1900 vl	Lesotho, Radio	4800do			
1800-1815	Liberia,LCN/R Liberia Int	5100do			
1800-1900	Malaysia, Radio	7295do			
1800-1900	N Marianas, KFBS Saipan	9465as			
1800-1900	N Marianas, KHBI Saipan	13820as			
1800-1830	Netherlands, Radio	6020af	7120af	11655af	
1800-1900 vl	Nigeria, Radio/Ibadan	6050do			
1800-1900 vl	Nigeria, Radio/Kaduna	4770do			
1800-1900	Nigeria, Radio/Lagos	3326do			
1800-1900 vl	Nigeria, Voice of	7255af	15120va		
1800-1900	North Korea, R Pyongyang	6575eu	9335eu	11710am	13760am
1800-1900	Palau, KHBN/Voice of Hope	9965as			
1800-1900 vl	Papua New Guinea, NBC	4890do			
1800-1900	Philippines, R Pilipinas	11720as	15190as	17720as	
1800-1900	Poland, Polish R Warsaw	6095eu	7285eu	9525eu	
1800-1900	Russia,Voice of Russia WS	7300eu	9480eu	9720eu	9775eu
		11510af	12065af		
1800-1900 smwhfa	Russia,Voice of Russia WS	9820eu			
1800-1830	S Africa, AWR Africa	5960af	6100af		
1800-1830	S Africa, Channel Africa	17870af			
1800-1900	Sierra Leone, SLBS	3316do			
1800-1900 vl	Solomon Islands, SIBC	5020do			
1800-1810	Somalia, Radio Mogadishu	6690af			
1800-1900	Sudan, Radio Omdurman	9200va			
1800-1830	Swaziland, Trans World R	9500af			
1800-1900	Swaziland, Trans World R	3200af			
1800-1900	Taiwan, Radio Taipei Intl	3955eu			
1800-1900	Tanzania, Radio	5050af			
1800-1900	UK, BBC World Service	3255af	5975as	6005as	6180eu
	6190af 6195eu	9410eu	9510as	9740pa	11995me
	12095eu 15400af	15420af	15485eu	15575eu	17830af
	17840am				
1800-1900	USA, KAIJ Dallas TX	13815na			
1800-1900	USA, KJES Vado NM	15385na			
1800-1900	USA, KTBN Salt Lk City UT	15590na			
1800-1900	USA, KWHR Naalehu HI	17510as			
1800-1900	USA, Voice of America	6035af	7415af	9760af	9770me
	11975af 13820as	15410af	15580af	17895af	
1800-1900	USA, WEWN Birmingham AL	11875na	13615na		
1800-1900	USA, WGTG McCaysville GA	9370al	9400am		
1800-1900	USA, WHRA Greenbush ME	17650af			
1800-1900	USA, WHRI Noblesville IN	9495sa	13760na		
1800-1900	USA, WINB Red Lion PA	13800am			
1800-1900	USA, WJCR Upton KY	7490na			
1800-1900 irreg	USA, WMLK Bethel PA	9465am			
1800-1900	USA, WRNO New Orleans LA	7395na			
1800-1900	USA, WSHB Cypress Crk SC	15665eu	18915af		
1800-1900	USA, WWCR Nashville TN	9475na	12160na	13845na	15685na
1800-1900	USA, WYFR Okeechobee FL	15695eu			
1800-1900 vl	Vanuatu, Radio	4960do			
1800-1827	Vietnam, Voice of	9730eu	13740eu		
1800-1900	Yemen, Rep of Yemen Radio	9780do			
1800-1900	Zambia, Christian Voice	4965do			
1800-1900	Zambia, Natl BC Corp	6165do	6265do		
1800-1900 vl	Zimbabwe, Zimbabwe BC	3306do	4828do		
1830-1900	Ascension Is,RTE Radio	21630af			
1830-1856	Belgium,R Vlaanderen Intl	5910eu	9925eu	11840af	13685eu
1830-1900 as	Georgia, Georgian Radio	6080me			
1830-1900 s	Germany, Universal Life	11785af			
1830-1900	Kiribati, Radio	9810do			
1830-1900	Netherlands, Radio	6020af	7120af	9895af	11655af
		13700af	17605af	21590af	
1830-1900 w	Philippines, FEBC R Intl	9465eu			
1830-1900 as	USA, Voice of America	7170af	11940af	15525af	
1850-1900	New Zealand, R NZ Intl	11675va			

Frequencies

1900-2000	Anguilla,Caribbean Beacon	11775am			
1900-2000 vl	Australia, ABC/Katherine	2485do			
1900-2000 vl	Australia, ABC/Tent Creek	2325do			
1900-2000	Australia, Radio	6080pa	7240va	9500as	9580va
		9660va	11880va		
1900-1930	Azerbaijan, R Dada Gorgud	9165me			
1900-2000 vl	Botswana, Radio	4820do	4830do		
1900-2000	Canada, CFRX Toronto	6070do			
1900-2000	Canada, CFVP Calgary	6030do			
1900-2000	Canada, CHNX Halifax	6130do			
1900-2000	Canada, CKZN St John's	6160do			
1900-2000	Canada, CKZU Vancouver	6160do			
1900-1956	China, China Radio Intl	9440af	11750af	13650af	15360af
1900-2000	Costa Rica,RF Peace Intl	15050am	21460am		
1900-2000	Ecuador, HCJB	17660eu	21455va		
1900-2000	Eqt Guinea, Radio Africa	15186af			
1900-1930	Finland, YLE/R Finland	6135eu			
1900-1945	Germany, Deutsche Welle	9640af	11785af	11810af	13790af
		15390af	17810af		
1900-2000	Germany,Overcomer Ministr	3965eu			
1900-2000	Guatemala, Adv World R	5980am			
1900-2000	Guyana, GBC/Voice of	5950do			
1900-1945	India, All India Radio	7410af	9635af	9950eu	11620eu
		11935af	13780af	15200af	
1900-2000 vl	Italy, IRRS	3985va			
1900-2000	Kenya, Kenya BC Corp	4885do	4935do		
1900-2000	Kiribati, Radio	9810do			
1900-2000	Kuwait, Radio	11990am			
1900-2000	Lebanon, Voice of Hope	6280me	11515al	11530me	
1900-2000 vl	Lesotho, Radio	4800do			
1900-1915	Liberia,LCN/R Liberia Int	5100do			
1900-2000	Malaysia, Radio	7295do			
1900-1930	Mongolia, Voice of	9720eu	12015eu		
1900-2000	N Marianas, KFBS Saipan	9465as			
1900-2000	Netherlands, Radio	6020af	7120af	9895af	11655af
		13700af	17605af	21590af	
1900-1950	New Zealand, R NZ Intl	11695va			
1900-2000 vl	Nigeria, Radio/Ibadan	6050do			
1900-2000 vl	Nigeria, Radio/Kaduna	4770do			
1900-2000	Nigeria, Radio/Lagos	3326do			
1900-2000	Nigeria, Voice of	7255af	15120va		
1900-2000	North Korea, R Pyongyang	6520eu	9600me	9975af	
1900-1930 m-a/vl	Papua New Guinea, NBC	4890do	9675do		
1900-1930	Philippines, R Pilipinas	11720as	15190as	17720as	
1900-2000	Russia,Voice of Russia WS	7300eu	7330eu	9480eu	9720eu
		9775eu	9820eu	9865eu	11510af
		11985eu	12025af	12065af	
1900-2000	Sierra Leone, SLBS	3316do			
1900-2000 vl	Solomon Islands, SIBC	5020do			
1900-2000	South Korea, R Korea Intl	5975om	7275eu		
1900-2000	Swaziland, Trans World R	3200af			
1900-1930	Tanzania, Radio	5050af			
1900-2000	Thailand, Radio	7210eu	9655eu	11905eu	
1900-2000	Uganda, Radio	4976do			
1900-2000	UK, BBC World Service	3255af	6005af	6180eu	6190af
	6195eu 9410eu	9630af	9740pa	11835af	11995me
	12095eu 15400af	17830af			
1900-2000	USA, KAIJ Dallas TX	13815na			
1900-2000	USA, KTBN Salt Lk City UT	15590na			
1900-2000	USA, KWHR Naalehu HI	17510as			
1900-2000	USA, Voice of America	4950af	6035af	7375af	7415af
	9525pa 9760af	9770af	11870pa	11975af	15180pa
	15410af 15445af	15580af			
1900-1930 as	USA, Voice of America	4950af			
1900-2000	USA, WEWN Birmingham AL	11875na	13615na		
1900-2000	USA, WGTG McCaysville GA	9400am	12170al		
1900-2000	USA, WHRA Greenbush ME	17650af			
1900-2000	USA, WHRI Noblesville IN	9495sa	13760na		
1900-2000	USA, WINB Red Lion PA	13800am			
1900-2000	USA, WJCR Upton KY	7490na			
1900-2000 a	USA, WRMI/R Miami INtl	9955am			
1900-2000	USA, WRNO New Orleans LA	7395na			
1900-2000	USA, WSHB Cypress Crk SC	15665eu	18915af		
1900-2000	USA, WWCR Nashville TN	9475na	12160na	13845na	15685na
1900-2000	USA, WYFR Okeechobee FL	15695eu			
1900-2000 vl	Vanuatu, Radio	4960do			
1900-1927	Vietnam, Voice of	9730eu	13740eu		
1900-2000	Zambia, Christian Voice	4965do			
1900-2000	Zambia, Natl BC Corp	6165do	6265do		
1900-2000 vl	Zimbabwe, Zimbabwe BC	3306do	4828do		
1930-2000	Georgia, Georgian Radio	11760eu			
1930-2000	Iran, VOIRI	7215eu	9022eu	9880as	
1930-2000	Serbia, Radio Yugoslavia	6100eu	9720eu		
1930-2000	Slovakia, R Slovakia Intl	5920eu	6055eu	7345eu	
1930-2000	Sweden, Radio	6065eu			
1930-2000	Turkey, Voice of	9670eu	11765eu	13695eu	
1935-1955	Italy, RAI Intl	5970eu	7160eu	9760eu	
1950-2000 smtwh	New Zealand, R NZ Intl	17675va			
1956-2000	S Africa, Voice of Hope	6290af			
1958-2000 smtwh	New Zealand, R NZ Intl	17675va			

2000 UTC

2000-2100	Algeria, R Algiers Intl	11715af	15160me		
2000-2100	Angola, Radio Nacional	3355af			
2000-2100	Anguilla,Caribbean Beacon	11775am			
2000-2100 vl	Australia, ABC/Alice Spgs	2310do			
2000-2100 vl	Australia, ABC/Katherine	2485do			
2000-2100 vl	Australia, ABC/Tent Creek	2325do			
2000-2100	Australia, Radio	9500as	9580va	9660va	11880va
		12080va			
2000-2100 vl	Botswana, Radio	4820do	4830do		
2000-2100	Bulgaria, Radio	9400eu	11720eu		
2000-2100	Canada, CFRX Toronto	6070do			
2000-2100	Canada, CFVP Calgary	6030do			
2000-2100	Canada, CHNX Halifax	6130do			
2000-2100	Canada, CKZN St John's	6160do			
2000-2100	Canada, CKZU Vancouver	6160do			
2000-2100	Canada, R Canada Intl	5995eu	11690eu	13650eu	13670eu
	15150eu 15325eu	15470eu	17570eu	17820eu	
2000-2056	China, China Radio Intl	6950eu	7590eu	9440af	9535eu
		11975af	15500af		
2000-2100	Costa Rica,RF Peace Intl	15050am	21460am		
2000-2027	Czech Rep, R Prague Intl	5930eu	11600va		
2000-2100	Ecuador, HCJB	17660eu	21455va		
2000-2100	Eqt Guinea, Radio Africa	15186af			
2000-2045	Germany, Deutsche Welle	11970eu			
2000-2100	Germany,Overcomer Ministr	3965eu			
2000-2030	Ghana, Ghana BC Corp	3366do	4915do		
2000-2100	Guatemala, Adv World R	5980am			
2000-2100	Guyana, GBC/Voice of	5950do			
2000-2030	Hungary, Radio Budapest	6025eu	7170eu		
2000-2100	Indonesia, Voice of	15150va			
2000-2030	Iran, VOIRI	7215eu	9022eu	9880eu	
2000-2100 irreg	Iraq, Radio Iraq Intl	11786am			
2000-2025	Israel, Kol Israel	11605va	15640af	15650va	17545va
2000-2100 vl	Italy, IRRS	3985va			
2000-2100	Kenya, Kenya BC Corp	4885do	4935do		
2000-2100	Kiribati, Radio	9810do			
2000-2100	Kuwait, Radio	11990am			
2000-2100	Lebanon, Voice of Hope	6280me	11515al	11530me	
2000-2100 vl	Lesotho, Radio	4800do			
2000-2055	Liberia,LCN/R Liberia Int	5100do			
2000-2100	Malaysia, Radio	7295do			
2000-2100 mtwhfa	Malta, VO Mediterranean	12060eu			
2000-2100	Namibia, NBC	3270af	3289af		
2000-2025	Netherlands, Radio	6020af	7120af	9895af	11655af
		13700af	17605af	21590af	
2000-2100	New Zealand, R NZ Intl	17675va			
2000-2015 vl	Niger, Voice du Sahel	5019do			
2000-2100 vl	Nigeria, Radio/Ibadan	6050do			
2000-2100 vl	Nigeria, Radio/Kaduna	4770do			
2000-2100	Nigeria, Radio/Lagos	3326do			
2000-2100	Nigeria, Voice of	7255af	15120va		
2000-2100 vl	Papua New Guinea, NBC	9675do			
2000-2100	Russia,Voice of Russia WS	7300eu	9720eu	9775eu	9820eu
		11980eu			
2000-2005	S Africa, Voice of Hope	6290af			
2000-2030	Serbia, Radio Yugoslavia	7230au			
2000-2100	Sierra Leone, SLBS	3316do			
2000-2100 vl	Solomon Islands, SIBC	5020do			
2000-2100 mtwhf	Spain, R Exterior Espana	9595af	15285eu		
2000-2100	Swaziland, Trans World R	3200af			
2000-2030	Switzerland, Swiss R Intl	9885eu	13710af	13770af	15220af
		17580af			
2000-2030	Turkey, Voice of	9670eu	11765eu	13695eu	
2000-2100	Uganda, Radio	4976do			
2000-2100	UK, BBC World Service	3255af	3955eu	5975pa	6005af
	6180eu 6190af	6195va	9410eu	9630af	9740pa
	11835af 12095eu	15400af	17830af		
2000-2100	USA, KAIJ Dallas TX	13815na			
2000-2100	USA, KTBN Salt Lk City UT	15590na			
2000-2100	USA, KWHR Naalehu HI	17510as			
2000-2100	USA, Voice of America	4950af	6035af	6095me	7375af
	7415af 9760af	9770af	11855af	11975af	15410af
	15445af 15580af	17725af	17745af		
2000-2100	USA, WBCQ Monticello ME	7415na			
2000-2100	USA, WEWN Birmingham AL	11875na	13615na		
2000-2100	USA, WGTG McCaysville GA	9400am			
2000-2100	USA, WHRA Greenbush ME	17650af			
2000-2100	USA, WHRI Noblesville IN	5745sa	9495na		
2000-2100	USA, WINB Red Lion PA	13800am			
2000-2100	USA, WJCR Upton KY	7490na			
2000-2100 as	USA, WRMI/R Miami Intl	9955am			
2000-2100	USA, WRNO New Orleans LA	7395na			
2000-2l00	USA, WSHB Cypress Crk SC	15665eu	18915af		
2000-2100	USA, WWCR Nashville TN	9475na	12160na	13845na	15685na
2000-2100	USA, WYFR Okeechobee FL	15695eu	17845af		
2000-2045	USA, WYFR Okeechobee FL	17750na			
2000-2100 vl	Vanuatu, Radio	4960do			
2000-2010	Vatican City, Vatican R	9660af	11625af	13765va	
2000-2100	Zambia, Christian Voice	4965do			
2000-2100	Zambia, Natl BC Corp	6165do	6265do		
2000-2100 vl	Zimbabwe, Zimbabwe BC	3306do	4828do		
2005-2100	Syria, Radio Damascus	12085eu	13610eu		
2010-2030	Vatican City, Vatican R	9660af	11625af	13765va	
2015-2030	Albania, R Tirana Intl	7180eu	9510eu		
2015-2100 vl	Libya, Voice of Africa	15235va	15415va	15435va	
2025-2045	Italy, RAI Intl	7220af	9710af	11880af	
2030-2100 th	Belarus, R Minsk	7210eu	11960eu		
2030-2056	Belgium,R Vlaanderen Intl	5960eu			
2030-2100	Cuba, Radio Havana	13660eu	13715eu		
2030-2100	Egypt, Radio Cairo	15375af			
2030-2100	Germany, AWR Europe	15560af			
2030-2055	Moldova, R Moldova Intl	7520eu			
2030-2100	Poland, Polish R Warsaw	6035eu	6095eu	7285eu	9525eu
2030-2100	S Africa, AWR Africa	9745af			
2030-2045	Thailand, Radio	9655eu	9680eu	11905eu	
2030-2100 as	USA, Voice of America	4950af			
2030-2100	Uzbekistan, R Tashkent	9540eu	9545va		
2030-2057	Vietnam, Voice of	9730eu	13740eu		
2045-2100	India, All India Radio	7150au	7410eu	9650eu	9910au
		9950eu	11620eu	11715eu	
2050-2100	Vatican City, Vatican R	4005eu	5883eu	7250eu	9645eu

Frequencies

2100-2200	Anguilla,Caribbean Beacon	11775am			
2100-2130 vl	Australia, ABC/Alice Spgs	2310do			
2100-2130 vl	Australia, ABC/Katherine	2485do			
2100-2200 vl	Australia, ABC/Katherine	5025do			
2100-2130 vl	Australia, ABC/Tent Creek	2325do			
2100-2130	Australia, Radio	7240pa	9500as	9580va	9660pa
		11880va	12080va	17580va	21740va
2100-2200 vl	Botswana, Radio	3356do	4820do		
2100-2200 vl	Canada, CBC N Quebec Svc	9625do			
2100-2200	Canada, CFRX Toronto	6070do			
2100-2200	Canada, CFVP Calgary	6030do			
2100-2200	Canada, CHNX Halifax	6130do			
2100-2200	Canada, CKZN St John's	6160do			
2100-2200	Canada, CKZU Vancouver	6160do			
2100-2129	Canada, R Canada Intl	7235eu	11690eu	13650eu	13670eu
	15150eu 15325eu	15470eu	17570eu	17820eu	
2100-2130	China, China Radio Intl	6950eu	7110eu	7160eu	7590eu
		9535eu	11975af	15500eu	
2100-2200	Costa Rica,RF Peace Intl	15050am	21460am		
2100-2130	Cuba, Radio Havana	13750eu			
2100-2200	Ecuador, HCJB	15300eu	21455va		
2100-2200	Egypt, Radio Cairo	15375af			
2100-2200	Eqt Guinea, Radio Africa	15186af			
2100-2145	Germany, Deutsche Welle	9670as	9765as	9875af	11865af
		11915as	13780as	15135va	
2100-2200	Guyana, GBC/Voice of	5950do			
2100-2200	India, All India Radio	7150au	7410eu	9650eu	9910au
		9950eu	11620eu	11715eu	
2100-2200 vl	Italy, IRRS	3985va			
2100-2200	Japan, Radio/NHK	6035pa	9725eu	17825na	21610pa
2100-2130	Kenya, Kenya BC Corp	4885do	4935do		
2100-2130	Kiribati, Radio	9810do			
2100-2200	Lebanon, Voice of Hope	6280me	11515al	11530me	
2100-2200 vl	Lesotho, Radio	4800do			
2100-2115	Liberia,LCN/R Liberia Int	5100do			
2100-2200	Malaysia, Radio	7295do			
2100-2200	Namibia, NBC	3270af	3289af		
2100-2200	New Zealand, R NZ Intl	17675va			
2100-2200 vl	Nigeria, Radio/Ibadan	6050do			
2100-2200 vl	Nigeria, Radio/Kaduna	4770do			
2100-2200	Nigeria, Radio/Lagos	3326do			
2100-2200	North Korea, R Pyongyang	6575eu	9335as	11710am	13760am
2100-2200	Palau, KHBN/Voice of Hope	9985as			
2100-2200 vl	Papua New Guinea, NBC	9675do			
2100-2130	Poland, Polish R Warsaw	6035eu	6095eu	7285eu	9525eu
2100-2200	Romania, R Romania Intl	9570eu	11725eu	11810eu	11840eu
		15180eu			
2100-2200	Russia,Voice of Russia WS	7300eu	7440eu	9480eu	9720eu
		9775eu	9820eu	12070eu	
2100-2200	Sierra Leone, SLBS	3316do			
2100-2200 vl	Solomon Islands, SIBC	5020do			
2100-2130	South Korea, R Korea Intl	3970eu	6480eu	15575eu	
2100-2200 as	Spain, R Exterior Espana	9595af	15205eu		
2100-2200	Swaziland, Trans World R	3200af			
2100-2200	UK, BBC World Service	3255af	3915as	3955eu	5965as
	5975va 6005af	6180eu	6190af	6195va	9410eu
	9740pa 11835af	11945as	12095sa	15400af	
2100-2200 f	UK, Merlin Network One	6140eu	7325eu	9720eu	
2100-2200	USA, KAIJ Dallas TX	13815na			
2100-2200	USA, KTBN Salt Lk City UT	15590na			
2100-2200	USA, KWHR Naalehu HI	17510as			
2100-2200	USA, Voice of America	6035af	6040me	7375af	7415af
	9535af 9705as	9760as	11870pa	11975af	15185as
	15410af 15445af	15580af	17725af	17735as	
2100-2200	USA, WBCQ Monticello ME	7415na			
2100-2200	USA, WEWN Birmingham AL	9385eu	11875na		
2100-2200	USA, WGTG McCaysville GA	9400am	12170am		
2100-2200	USA, WHRA Greenbush ME	17650af			
2100-2200	USA, WHRI Noblesville IN	5745na	9495sa		
2100-2200	USA, WINB Red Lion PA	13790am			
2100-2200	USA, WJCR Upton KY	7490na			
2100-2200 as	USA, WRMI/R Miami Intl	9955am			
2100-2200	USA, WRNO New Orleans LA	7395na			
2100-2200	USA, WSHB Cypress Crk SC	11815af	15665eu		
2100-2200	USA, WWCR Nashville TN	9475na	12160na	13845na	15685na
2100-2200	USA, WYFR Okeechobee FL	15360va	15695af	17845af	
2100-2200 vl	Vanuatu, Radio	4960do			
2100-2110	Vatican City, Vatican R	4005eu	7250eu	9645eu	
2100-2200	Zambia, Christian Voice	4965do			
2100-2200	Zambia, Natl BC Corp	6165do	6265do		
2100-2200 vl	Zimbabwe, Zimbabwe BC	3306do	4828do		
2105-2200	Syria, Radio Damascus	12085na	13610na		
2115-2145 mtwhfa	Armenia, Voice of	4810va	9965va		
2115-2200	Egypt, Radio Cairo	9990eu			
2115-2130 mtwhf	UK, BBC Caribbean Report	5975ca	15390ca	17715ca	
2115-2130 as	UK, BBC World Service	5975am			
2130-2200 vl	Australia, ABC/Tent Creek	4910do			
2130-2200	Australia, Radio	7240pa	9660pa	11880va	12080va
		17580va	21740va		
2130-2200	Austria, R Austria Intl	6155eu			
2130-2200 smtwha	Austria, R Austria Intl	5945eu	13730af		
2130-2200 th	Belarus, R Minsk	7210eu	11960eu		
2130-2157	Czech Rep, R Prague Intl	11600va	15545af		
2130-2200	Guam, AWR/KSDA	15550as			
2130-2200	Iran, VOIRI	11740as	13745as		
2130-2155	Moldova, R Moldova Intl	7520eu			
2130-2200	South Korea, R Korea Intl	15575eu			
2130-2200	Sweden, Radio	6065eu	9430eu		
2130-2200	Turkey, Voice of	7170va			
2130-2145 tf	UK, BBC Calling Falklands	11680sa			
2130-2200	USA, Voice of America	6040me	9535af	9705as	11870pa
		15185as	17735as		
2130-2200 smtwhf	USA, Voice of America	6035af	7375af	7415af	11975af
		15410af	15445af	15580af	17725af
2130-2200	Uzbekistan, R Tashkent	9540eu	9545va		

2200 UTC

2200-2300	Anguilla,Caribbean Beacon	6090am			
2200-2300 vl	Australia, ABC/Katherine	5025do			
2200-2300 vl	Australia, ABC/Tent Creek	4910do			
2200-2300	Australia, Radio	17580va	17795va	21740va	
2200-2300	Bulgaria, Radio	9400eu	11720eu		
2200-2300	Canada, CBC N Quebec Svc	9625do			
2200-2300	Canada, CFRX Toronto	6070do			
2200-2300	Canada, CFVP Calgary	6030do			
2200-2300	Canada, CHNX Halifax	6130do			
2200-2300	Canada, CKZN St John's	6160do			
2200-2300	Canada, CKZU Vancouver	6160do			
2200-2229	Canada, R Canada Intl	5960na	9755na	11705as	13670am
		15305am			
2200-2256	China, China Radio Intl	9880eu			
2200-2300	Costa Rica,RF Peace Intl	15050am	21460am		
2200-2205	Croatia, Croatian Radio	13830eu			
2200-2245	Egypt, Radio Cairo	9990eu			
2200-2300	Eqt Guinea, Radio Africa	15186af			
2200-2215	Ghana, Ghana BC Corp	3366do	4915do		
2200-2300	Guyana, GBC/Voice of	5950do			
2200-2230	Hungary, Radio Budapest	6025eu			
2200-2230	India, All India Radio	7150au	7410eu	9650eu	9910au
		9950eu	11620eu	11715eu	
2200-2230	Iran, VOIRI	11740as	13745as		
2200-2230 irreg	Iraq, Radio Iraq Intl	9685va			
2200-2225	Italy, RAI Intl	9675as	11900as	15240as	
2200-2215	Liberia,LCN/R Liberia Int	5100do			
2200-2300	Malaysia, Radio	7295do			
2200-2300	Namibia, NBC	3270af	3289af		
2200-2300	New Zealand, R NZ Intl	17675va			
2200-2300 vl	Nigeria, Radio/Ibadan	6050do			
2200-2300 vl	Nigeria, Radio/Kaduna	4770do			
2200-2300	Nigeria, Radio/Lagos	3326do			
2200-2300	Palau, KHBN/Voice of Hope	9985as			
2200-2300 vl	Papua New Guinea, NBC	9675do			
2200-2230	Serbia, Radio Yugoslavia	6100eu	6185eu		
2200-2300	Sierra Leone, SLBS	3316do			
2200-2300 vl	Solomon Islands, SIBC	5020do			
2200-2215	Swaziland, Trans World R	3200af			
2200-2205	Syria, Radio Damascus	12085eu	13610na		
2200-2300	Taiwan, Radio Taipei Intl	11565eu	15600eu		
2200-2230	Turkey, Voice of	7170va			
2200-2300	UK, BBC World Service	5965as	5975am	6175am	6195va
	7110as 9590am	9660as	9890as	9915sa	11835af
	11955as 12080pa	12095sa	15400af		
2200-2300 f	UK, Merlin Network One	6140eu	7325eu	9720eu	
2200-2300	Ukraine, R Ukraine Intl	5905eu	6020eu	6090eu	9560eu
		17715eu			
2200-2300	USA, KAIJ Dallas TX	13815na			
2200-2300	USA, KTBN Salt Lk City UT	15590na			
2200-2300	USA, KWHR Naalehu HI	17510as			
2200-2230 mtwhf	USA, Voice of America	6035af	7215as	7340af	7375as
	7415af 9705as	9770as	11760as	11975af	15185as
	15290as 15305as	17735as	17820as		
2200-2300	USA, WBCQ Monticello ME	7415na			
2200-2300	USA, WEWN Birmingham AL	9385eu	13615na		
2200-2300	USA, WGTG McCaysville GA	6890am	9400am		
2200-2300	USA, WHRA Greenbush ME	17650af			
2200-2300	USA, WHRI Noblesville IN	5745na	9495sa		
2200-2300	USA, WINB Red Lion PA	13790am			
2200-2300	USA, WJCR Upton KY	7490na			
2200-2230 as	USA, WRMI/R Miami Intl	9955am			
2200-2300	USA, WRNO New Orleans LA	7395na			
2200-2300	USA, WSHB Cypress Crk SC	13770eu	15285sa		
2200-2300	USA, WWCR Nashville TN	7435na	9475na	12160na	13845na
2200-2245	USA, WYFR Okeechobee FL	15360va	17845af		
2200-2300	USA, WYFR Okeechobee FL	11740na			
2200-2300 vl	Vanuatu, Radio	4960do			
2200-2210	Zambia, Natl BC Corp	6165do	6265do		
2229-2300	Canada, R Canada Intl	5960na	9755na	13670na	
2230-2300	Albania, R Tirana Intl	7160eu	9635eu		
2230-2300	Cuba, Radio Havana	9550am			
2230-2257	Czech Rep, R Prague Intl	11600na	15545na		
2230-2300	Hungary, Radio Budapest	3975eu			
2230-2300	USA, Voice of America	7215as	9705as	9770as	11760as
	15185as 15290as	15305as	17735as	17820as	
2245-2300	India, All India Radio	7410as	9705as	9950as	11620as
		13625as			
2245-2300	Vatican City, Vatican R	9600as	11830as		

Frequencies

2300-0000	Anguilla,Caribbean Beacon	6090am			
2300-0000 vl	Australia, ABC/Katherine	5025do			
2300-0000 vl	Australia, ABC/Tent Creek	4910do			
2300-0000	Australia, Radio	9660pa	12080va	17580va	17795va
		21740va			
2300-0000	Canada, CBC N Quebec Svc	9625do			
2300-0000	Canada, CFRX Toronto	6070do			
2300-0000	Canada, CFVP Calgary	6030do			
2300-0000	Canada, CHNX Halifax	6130do			
2300-0000	Canada, CKZN St John's	6160do			
2300-0000	Canada, CKZU Vancouver	6160do			
2300-2330	Canada, R Canada Intl	5960na	9755na	11895am	13670am
		15305am			
2300-0000	China, China Radio Intl	5995na			
2300-0000	Costa Rica,RF Peace Intl	15050am	21460am		
2300-2330	Cuba, Radio Havana	9550am			
2300-0000	Egypt, Radio Cairo	9900am			
2300-2345	Germany, Deutsche Welle	9715as	9815as	11965as	
2300-0000 s	Germany, Good News World	9405sa			
2300-0000	Guyana, GBC/Voice of	5950do			
2300-0000	India, All India Radio	7410as	9705as	9950as	11620as
		13625as			
2300-0000	Japan, Radio/NHK	15485va			
2300-2315	Liberia,LCN/R Liberia Int	5100do			
2300-0000	Malaysia, Radio	7295do			
2300-2330	Mexico, Radio Mexico Intl	9705am			
2300-0000	Namibia, NBC	3270af	3289af		
2300-0000	New Zealand, R NZ Intl	17675va			
2300-2330 vl	Nigeria, Radio/Ibadan	6050do			
2300-2330 vl	Nigeria, Radio/Kaduna	4770do			
2300-2330	Nigeria, Radio/Lagos	3326do			
2300-0000	North Korea, R Pyongyang	11335am	13760am	15130am	
2300-0000	Palau, KHBN/Voice of Hope	9955as	9965as	9985as	
2300-0000 vl	Papua New Guinea, NBC	9675do			
2300-0000	Romania, R Romania Intl	9570eu	11810eu	11830na	15105na
2300-0000	Sierra Leone, SLBS	3316do			
2300-0000	Singapore,RCorp Singapore	6150do			
2300-0000 vl	Solomon Islands, SIBC	5020do			
2300-0000	Turkey, Voice of	7190eu	13640na		
2300-0000	UK, BBC World Service	3915as	5965as	5975am	6035as
	6175am	6195as	7110as	9590am	9915sa
	11945as	11955as	12095sa	15280as	
2300-0000 f	UK, Merlin Network One	6015eu	7325eu	9720eu	
2300-0000	USA, KAIJ Dallas TX	13815na			
2300-0000	USA, KTBN Salt Lk City UT	15590na			
2300-0000	USA, KWHR Naalehu HI	17510as			
2300-0000	USA, Voice of America	7215as	9705as	9770as	11760as
	15185as	15290as	15305as	17735as	17820as
2300-0000	USA, WBCQ Monticello ME	7415na			
2300-0000	USA, WEWN Birmingham AL	9385eu	13615na		
2300-0000	USA, WGTG McCaysville GA	5085am	6890am		
2300-0000	USA, WHRA Greenbush ME	7580af			
2300-0000	USA, WHRI Noblesville IN	5745na	9495sa		
2300-0000	USA, WINB Red Lion PA	13790am			
2300-0000	USA, WJCR Upton KY	7490na			
2300-0000	USA, WRNO New Orleans LA	7355na			
2300-0000	USA, WSHB Cypress Crk SC	13770va	15285sa		
2300-0000	USA, WWCR Nashville TN	3215na	7435na	9475na	13845na
2300-2345	USA, WYFR Okeechobee FL	11740na			
2300-0000 vl	Vanuatu, Radio	4960do			
2300-2305	Vatican City, Vatican R	9600as	11830as		
2315-0000 vl	Libya, Voice of Africa	15235va	15415va	15435va	
2330-2356	Belgium,R Vlaanderen Intl	15565na			
2330-0000	Canada, R Canada Intl	5960na	9755na	13670am	
2330-0000 as	Canada, R Canada Intl	11895am	15305am		
2330-0000 vl	Guatemala, Radio Cultural	3300do			
2330-0000	Malaysia, RTM Sarawak	7160do			
2330-0000	Netherlands, Radio	6165na	9845na		
2330-2357	Vietnam, Voice of	9840as	12020as		
2345-0000	Ghana, Ghana BC Corp	3366do	4915do		

Selected Programs

Sundays

2300 Australia, Radio: RA News. See S 0000.
2300 USA, WINB Red Lion PA: Bible Truth Gospel Radio.
2300 USA, WINB Red Lion PA: Discoveries in Health.
2300 USA, WWCR #3 Nashville TN: Discoveries in Health (hour 1) (live). A health and herbs show from the American Freedom Network in which new treatments are discussed.
2305 USA, WWCR #1 Nashville TN: The Spoken Word of God. Alexander Scourby narrates the King James version of The New Testament.
2310 Australia, Radio: Australia All Over. Join listeners across the island continent as Ian McNamara throws the spotlight on life in Australia.
2315 USA, WWCR #1 Nashville TN: New Horizons. London Radio Service.
2330 USA, WWCR #1 Nashville TN: The Old Record Shop. See S 0630.

Monday-Friday

2300 Australia, Radio: RA News. See S 0000.
2300 USA, WWCR #1 Nashville TN: Freedom Now (live). Irwin Schiff, a self-professed leading authority on federal income tax, talks from Las Vegas.

Mondays

2300 USA, WINB Red Lion PA: Voice of Evangelism.
2300 USA, WWCR #3 Nashville TN: USA Radio News. See S 0400.
2305 USA, WWCR #3 Nashville TN: Point of View. Marlin Maddoux interviewing on current events of interest to Christians.
2310 Australia, Radio: Correspondents' Report. See S 0010.
2330 Australia, Radio: Earthbeat. Peter Jacklyn examines environmental issues of the region from a scientific perspective.

Tuesdays

2300 USA, WINB Red Lion PA: Day of Decision.
2300 USA, WWCR #3 Nashville TN: Lyon Gold and Silver Magnet Program (live). See M 0430.
2310 Australia, Radio: Asia Pacific. See M 1105.
2330 Australia, Radio: Innovations. See S 0230.
2330 USA, WINB Red Lion PA: Good News Hour.

Wednesdays

2300 USA, WINB Red Lion PA: Gospel Greats.
2300 USA, WWCR #3 Nashville TN: USA Radio News. See S 0400.
2305 USA, WWCR #3 Nashville TN: Point of View. See M 2305.
2310 Australia, Radio: Asia Pacific. See M 1105.
2330 Australia, Radio: Arts Talk. Julie Copeland discusses arts and cultural ideas with a studio guest.

Thursdays

2300 USA, WINB Red Lion PA: Apostolic Witness.
2300 USA, WWCR #3 Nashville TN: Lyon Gold and Silver Magnet Program (live). See M 0430.
2310 Australia, Radio: Asia Pacific. See M 1105.
2330 Australia, Radio: Rural Reporter. See S 0030.
2330 USA, WINB Red Lion PA: Manna from Heaven .

Fridays

2300 USA, WINB Red Lion PA: The Wesleyan Hour.
2300 USA, WWCR #3 Nashville TN: USA Radio News. See S 0400.
2305 USA, WWCR #3 Nashville TN: Point of View. See M 2305.
2310 Australia, Radio: Asia Pacific. See M 1105.
2330 Australia, Radio: Media Report. See H 0030.
2330 USA, WINB Red Lion PA: Focus on the Kingdom.
2345 USA, WINB Red Lion PA: Reality in Jesus.

Saturdays

2300 Australia, Radio: RA News. See S 0000.
2300 USA, WWCR #1 Nashville TN: Weekly Presidential Radio Address (repeat). A repeat of Bill Clinton's weekly report to the nation.
2300 USA, WWCR #3 Nashville TN: Odyssey USA. Focus on the Family.
2307 USA, WWCR #1 Nashville TN: The Republican Response. A noted Republican rebuts the President's weekly radio message.
2310 Australia, Radio: Book Reading. See A 0345.
2315 USA, WWCR #1 Nashville TN: The Blessed Word of Life. Perry L. Johnson preaches in Spanish and English from Washington, DC.
2320 Australia, Radio: Lingua Franca. See A 0330.
2330 Australia, Radio: In Conversation. See S 0530.
2330 USA, WWCR #1 Nashville TN: The People's Gospel Hour. From Nova Scotia, Canada, Perry Rockwood interprets scripture for Christian life.
2330 USA, WWCR #3 Nashville TN: God Said Ministries. W.N. Otwell preaches from Texas.

PROPAGATION FORECASTING

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How to Use this Page

A new DX season has now started which could be the best season of the present sun cycle. The predictions are for the maximum of cycle 23 to occur sometime in 2000, and using propagation forecasts could further enhance these already excellent reception conditions. It may be time for a refresher course on how to make the best use of the propagation chart.

The *MT* table is set up to cover three main areas of the continental US and the same circuits are calculated for each area. The *MT* forecasts are calculated to cover from mid-month to mid-month as indicated. If you live in Canada and have access to the Internet, you can check the following sites for similar tables for Canadian users: **http://www.rac.ca/proptxt.htm** and **http://www.odxa.on.ca/rac2txt99.htm**.

What is displayed in the *MT* and Canadian tables is the OWF (Optimum Working Frequency) for a particular circuit. This frequency (expressed in megahertz) should give you a 90 percent chance to hear a station broadcasting from the other end of the circuit.

The tabulated OWF is approximately equivalent to 80 percent of the MUF (Maximum Usable Frequency), so it never hurts to go higher in your search. For example, if the OWF is 8.0 MHz, the MUF would be 10 MHz, so you could go searching in the upper reaches up to 10 MHz. When you reach the MUF, your chances of hearing a good signal have now decreased to about 10%. It is possible to hear signals at frequencies even higher than the MUF, but not on a regular basis.

As it is relatively safe to assume reciprocity in the forecasts most of the time, the *MT* circuits are labelled "TO/FROM." This reciprocity assumption is not always correct, but we know that the *MT* forecasts have been used with success to listen to North America broadcasts from overseas. Listeners in Switzerland and Germany have used the "Western Europe" circuits to choose the best frequency to listen to shortwave stations on the East Coast and midwestern North America. Amateur radio operators have also used the tabulated values for successful two-way communications from various areas around the world. The two Internet sites for the Canadian circuits contain many additional circuits.

A "P" after the name of a circuit indicates that the signal on that particular circuit can be influenced by auroral zone while travelling across the pole, so keep your ears tuned to the WWV / WWVH broadcasts for the latest forecasted conditions.

OPTIMUM WORKING FREQUENCIES (MHz)

For the Period 15 November to 14 December 1999 Flux=204 SSN=159

Predictions prepared using ASAPS for Windows®

UTC	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
TO/FROM US WEST COAST																								
SOUTH AMERICA	28	26	22	19	16	13	12	11	11	11	10	10	9	11	19	28	32	33	31	30	30	29	29	30
WESTERN EUROPE	9	9	9	9	9	9	9	10	10	9	9	9	9	9	11	16	22	23	19	16	14	12	11	10
EASTERN EUROPE (P)	9	9	9	9	10	10	12	11	10	10	10	10	10	10	11	15	20	16	14	12	*	*	*	9
MEDITERRANEAN	15	15	15	14	14	13	13	12	12	12	*	*	*	*	14	21	28	28	25	23	20	18	17	16
MIDDLE EAST (P)	12	12	12	14	16	14	13	11	11	*	11	11	11	11	12	14	19	16	13	12	12	12	12	11
CENTRAL AFRICA	24	24	23	20	16	14	13	13	*	*	*	*	*	*	17	26	27	26	24	23	24	26	26	25
SOUTH AFRICA	22	20	18	16	15	14	13	13	*	*	*	*	*	*	21	26	26	26	26	26	25	25	24	24
SOUTH EAST ASIA (P)	29	32	29	24	20	15	*	*	*	*	10	9	9	10	9	10	14	22	20	17	15	13	12	15
FAR EAST	32	30	27	22	18	14	12	10	9	9	9	9	9	9	9	10	10	10	10	*	11	18	27	33
AUSTRALIA	25	25	26	26	23	19	16	14	13	13	13	12	11	10	10	12	19	17	17	18	21	23	24	25
TO/FROM US MIDWEST																								
SOUTH AMERICA	24	20	17	14	12	11	11	10	10	9	9	9	10	17	25	29	29	29	28	27	27	26	26	26
WESTERN EUROPE	11	11	11	10	10	11	11	11	11	12	12	12	12	16	22	28	30	27	23	20	17	15	14	13
EASTERN EUROPE	8	8	8	8	9	9	12	12	12	12	11	11	11	13	19	25	21	17	14	11	10	9	8	8
MEDITERRANEAN	16	15	14	14	13	13	14	13	13	12	*	*	13	17	24	30	32	28	25	23	21	19	18	17
MIDDLE EAST (P)	12	12	12	13	15	14	13	13	12	12	12	12	13	14	20	23	21	17	15	13	13	13	12	12
CENTRAL AFRICA	24	24	20	17	16	15	15	14	14	*	*	*	16	24	27	27	27	27	25	24	24	27	27	25
SOUTH AFRICA	22	20	18	16	15	14	14	14	14	*	*	*	15	24	27	26	26	26	26	26	25	25	24	24
SOUTH EAST ASIA (P)	25	25	22	18	16	14	*	*	*	11	11	11	11	11	12	18	21	19	18	16	14	13	12	13
FAR EAST	30	27	23	19	15	13	12	11	11	10	10	10	10	10	11	11	11	10	*	*	11	17	27	33
AUSTRALIA	25	25	25	22	18	15	13	12	12	12	12	11	11	11	14	21	18	17	16	17	21	23	24	24
TO/FROM US EAST COAST																								
SOUTH AMERICA	19	16	14	13	12	11	11	10	9	8	8	9	16	23	26	27	26	25	24	23	23	23	23	21
ESTERN EUROPE	11	11	11	10	10	10	10	10	11	12	11	13	20	27	32	33	31	28	25	21	18	16	14	13
EASTERN EUROPE	9	9	8	9	9	9	12	12	12	12	11	12	18	26	29	26	21	17	14	12	11	10	9	9
MEDITERRANEAN	17	16	15	14	12	12	13	13	12	12	*	15	24	30	33	33	32	29	26	24	22	21	19	18
MIDDLE EAST (P)	12	12	13	13	15	14	14	14	13	13	13	14	20	29	28	25	23	19	16	14	14	14	13	13
CENTRAL AFRICA	23	20	18	17	16	16	15	14	13	*	*	22	27	28	28	28	28	28	26	25	25	27	28	26
SOUTH AFRICA	22	20	18	16	15	15	14	13	*	*	*	21	27	27	27	26	26	26	26	26	25	25	24	24
SOUTH EAST ASIA (P)	19	22	19	17	15	14	14	13	13	13	12	12	14	20	26	26	21	18	17	16	15	13	12	12
FAR EAST	28	25	22	19	16	15	14	14	13	13	13	12	13	12	12	12	11	11	11	12	12	17	27	31
AUSTRALIA	24	24	20	17	15	*	*	12	12	11	11	11	12	19	22	20	18	16	16	17	20	22	23	24

* ***Unfavorable conditions: Search around the last listed frequency for activity.***

(P) denotes circuit across polar auroral zone; reception may be poor during ionospheric disturbances.

The OWF can, at times, have a value of "0". This value is replaced by an asterisk (*) in the *MT* table and in the Canadian charts. When you see this, do not despair; keep on looking in the vicinity of the last frequency listed for that circuit. The reason why the OWF can have a value of "0" is simply that the absorption frequency (ALF) on this circuit, at that particular time, is higher than the OWF and, in theory, communication at the OWF should be impossible. But I have been in the in radio field long enough to know that theory doesn't always have the final word!

What do the various areas on the *MT* chart encompass? "Mediterranean" covers an area bounded in the North by Malta, in the East by Lebanon, in the South by all of North Africa and in the West by Gibraltar. "Middle East" is an area bounded by the Caspian Sea to the North, Saudi Arabia in the West, Yemen in the South and by Eastern Iran in the East. "South East Asia" is an area that covers a wide area bounded by Sri Lanka, Central China, Vietnam and Singapore. The "Far East" region comprises the broadcasters in the Western Pacific, Japan and the Philippines.

Enjoy successful DXing by using the propagation charts!

John Figliozzi
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Music on Shortwave - Foreign Language Broadcasts

We've come to the last in our series of three consecutive columns on music – and, in truth, we've only scratched the surface. Music may indeed be the "universal language," with performers, producers and presenters of every linguistic stripe.

Therefore, we need to create at least the appearance of an organized approach. As mentioned last month, the enjoyment of music on shortwave requires a strong signal that is reasonably in the clear. With that proviso, we will place primary focus on foreign language services by major broadcasters targeting expatriate or ethnic listeners in or near North America. *[The usual caveats apply – days and times in UTC, frequencies in kHz., abbreviations as per "MT Shortwave Guide," programs and times subject to change (try one hour later if your first attempt is unsuccessful]*:

Radio Austria International (in German)

Although many broadcasters are reducing the amount of music broadcast on shortwave, "Radio Osterreich International," happily, is not one of them. ROI's German Service carries a great deal of music from home to its overseas audience. These programs are:

Musicgalerie (the music of Johann Strauss-father and son) - M 0105, 1105
Klangbogen (concert and opera music) - A 0130
G'sungen und G'spielt ("volksmusik") - S 1205
Operettenstudio (opera) - M 1205
Neu auf CD (literally "New on CD") - T 1205
Planet RedWhiteRed (youth magazine) - W 1205
Hit-Parade - H 1205
Weinerlieder (Viennese songs) - F 1205
Wunschmelodien (literally "Desire Melodies") - A 2305; S 0305, 1305
Treffpunkt (literally "Meeting Place") - M 2305; T 0305, 1305
Jazzhouse Osterreich - T 2305; W 0305, 1305
Contra ("kabarett") - W 2305; H 0305, 1305

Frequencies: 0000-0300 on 9655 or 7325; *0500-0700 on 6015;* 1100-1400 on 13730; *2300-0400 on 9870 and13730 or 9495 (to Latin America, but often well received in North America).*

Deutsche Welle German Service

DW has significantly reduced its music programs in recent years and those which remain include more commentary than used to be the case. (An exception is their Christmas/New Year programming which is still largely made up of seasonal music.) Here's what remains on the regular schedule:

Klassik und Mehr ("Classical and More") - M-F 0535, 1335, 2135; T-A 0135
Bunte Noten ("Multicolored Notes") - S 0605, 1405, 1805, 2205; M 0205
Klassik und Mehr om Sonntag ("Classical and More on Sunday") - S 0635, 1435, 1835, 2235; M 0235
Szene (often a music program) - M-W 0735, 2335; M/T 1935; T-H 0335

Frequencies: 0535 on 6075, 6100, 9640, 9735; *0605, 0635, 0735 on 11985;* 1335 on 17730; *1405, 1435 on 17730, 17765, 17875;* 1805, 1835, 1935 on 17860; *2135 on 17810,17860;* 2205, 2235, 0135 on 6100, 9730, 11785, 15275, 15410; *0205, 0235, 0335 on 6075, 6100, 9735.*

Radio France Internationale (in French)

RFI had dropped all its music programs on shortwave, but at the insistance of its African audience restored one – *L'actualite de la musique tropiquale*, which features Afro-caribbean music. It airs M-F at 2100-2200 in the "RFI Afrique" service. Try 6175, 7160, 7315, 9790, 11705, 11995 and 15300.

Voice of America (in French)

VOA, on the other hand, has lots of music in its French service to Africa. (By the way, Georges Collinet, who hosts *Bon Jour Africa,* is the same person who hosts PRI's *Afropop Worldwide* on U.S. public radio.)

Bon Jour Africa (American, Latin and African hits) - M-F 0545, 0615
Le Disque de Auditeurs (music requests) - A 1900
Le Jazz d'Hier et Ad'Aujourd'hui (classical and contemporary jazz) - S 1900
La Musique Country - S 1935
Disques Preferes (American, world and African music) - M-F 2000
Jazz, Yesterday and Today - A 2000
Rock, Pop and Soul - S 2000

Frequencies: 0545, 0615 on 4960, 6120, 7265, 7370, 9480, 9505, 9650, 11750, 11875, 13705; *1900, 1935, 2000 on 7340, 9780, 9815, 11905, 12080, 17640, 21485.*

Radio Exterior de España Servicio Mundial

There's only one regular music program broadcast from REE's powerful transmitters. *Suena en España* ("Sounds in Spain") goes out every day 2200-2230 on 9765, 11880, 15110, 15170.

Radio Nederland (in Spanish)

Also with a powerful signal (owing to its Bonaire relay), **RN** produces *LFRN-fm*, which features eurorock music (F, repeated M at 2355); and *La Estación de la Alegría* (S 2235, M 0035, 0235), produced and presented by Jaime Baguena in the fine tradition of Eddie Startz and Tom Meyer (but not Pete Myers!). Indeed, one of the oldest programs on shortwave – *The Happy Station* – lives on in RN's Spanish service; and it sounds very much as you might remember it!

Frequencies: 2235, 2355 on 9895, 11715, 15315; *0035 on 9895, 15315;* 0235 on 6165.

BBC Latin American Service (in Spanish)

Both the **BBC** and the **VOA** (below) now emphasize satellite delivery of their programming to affiliated domestic stations in Latin America. The result for the **BBC** in Spanish is a mere three quarter-hour music programs on shortwave: a classical music program, *Nuevas Grabaciones* (Thu. 0045, 0345; Sun. 0015); a jazz program, *Notas de Jazz* (Tue. 0045, 0345); and *Discopromicias*, which illustrates the London music scene (Fri. 0345).

Frequencies: 0015, 0045 on 5875, 6110, 9825, 11765; *0345 on 5995, 6110, 7325, 9515.*

Voice of America (in Spanish)

One program – *Buenos Dias, Américas* – presents a variety of music within a cultural magazine format. (A/S 1200-1230 on 7370, 11890, 11925, 13770, 15360, 15390, 17875.)\

Radiodifusao Portuguesa Internacional

RDP dropped its English Service almost two years ago, but it retains a vibrant and well-heard shortwave service for expatriates in their native language.

Cantando Espalharei (literally "Singing We Will Spread") - A 1505
Espaco Musical ("Musical Space") - A 1605, 1915
A Guitarra Portuguesa e o Fado ("The Portuguese Guitar and the Destiny") - A 1705
Album da Cancao ("Album of Song") - M 0210
Disco Feira (translates to "Disco Fair," which I sincerely hope it isn't.) - T 2325

Frequencies: 1505, 1605, 1705, 1915 on 15220, 17745, 21655; *2325, 0210 on 9715, 11655, 11840, 13700, 15295.*

Radio Japan General Service (in Japanese)

RJ's Japanese service now relies a great deal on relays from the domestic network, *NHK Radio 1*. Only on Japanese radio are you likely to hear karaoke, and the voices I've heard here are decidedly amateur. But this kind of variety is one of the reasons why we listen to shortwave, right?

NHK Amateur Singing Contest - S 0315, 0815, 1615
Enjoy Music - A 0815
Music for Pleasure - A 1615

Continued on page 85

AUDIO SUBCARRIERS

By Robert Smathers, roberts@nmia.com

Audio frequencies in MHz. All satellite/transponder coordinates are C-band unless otherwise noted.
DS=Discrete Stereo

Classical Music		
SuperAudio–Classical Collections	G5, 21	6.30/6.48 (DS)
WCPE-FM (89.7) Raleigh/Durham/Chapel Hill, NC	G5, 7	5.58/6.12 (DS)
WFMT-FM (98.7) Chicago, IL–Fine Arts	G5, 7	6.30/6.48 (DS)
WQXR-FM (96.3) New York, NY	S4, 14	6.20/6.80 (DS)
Satellite Computer Services		
Superguide	G5, 7	5.48
Contemporary Music		
SuperAudio–*Light and Lively Rock*	G5, 21	5.96, 6.12 (DS)
WBES-FM (94.5) "Charleston's Soft Rock B94.5" Charleston, WV	GE1, 12	5.90
WPHZ-FM (96.9) Bremen, IN (South Bend market)	G6, 15	6.48, 7.30 (DS)
Country Music		
SuperAudio–*American Country Favorites*	G5, 21	5.04/7.74 (DS)
WSM-AM (650) Nashville, TN	C4, 24	7.38
Easy Listening Music		
FCC mandated safe-harbor program audio-easy listening music	G3R, 9	6.80
	G5, 2	6.80
SuperAudio–*Soft Sounds*	G5, 21	5.58/5.76 (DS)
United Video–easy listening music	C4, 8	5.895 (N)
Foreign Language Programming		
Antenna Radio (Greek)	S4, 14	7.80
Arab Network of America radio network	GE2, 22	5.80
La Cadena CNN Radio Noticias (CNN Radio News in Spanish)	G5, 17	7.56
Radio Sedaye Iran	GE3, 15	6.16
SRC AM Network	E2, 1	7.38
SRC FM Network	E2, 1	5.41/5.58 (DS)
WCRP-FM (88.1) Guyama, PR–religious (Spanish)	G6, 6	6.53
Jazz Music		
KLON-FM (88.1) Long Beach, CA., ID-*Jazz-88*	G5, 2	5.58/5.76 (DS)
Superaudio–*New Age of Jazz*	G5, 21	7.38/7.56 (DS)
News and Information Programming		
Broadcast News	E2, 1	5.78
Cable Radio Network	G5, 2	8.30
	G7,6	7.30
CNN Headline News	G5, 22	7.58
CNN Radio News	G5, 5	7.58
	G5,5	6.30
	G5, 22	6.30
USA Radio Network–news, talk and information	GE3, 13	5.01 , 5.20
WCBS-AM (880) New York, NY–news	T4, 11	7.38
Religious Programming		
Ambassasor Inspirational Radio	GE3, 15	5.96, 6.48
Brother Staire Radio	G5, 6	6.48
KHCB-FM (105.7) Houston, TX	GE1,9	7.28
KHVN-AM (1240) Charlotte, NC	G1R, 17	7.92
KMUS-AM (1380) Muskogee, OK	G1R, 24	5.80
LDS Radio Network	C1, 6	5.58
Radio 74 International	G3R, 23	5.58
Salem Radio Network	GE3, 17	5.01, 5.20
Trinity Broadcasting radio service	G5, 3	5.58/5.78 (DS)
Rock Music		
SuperAudio–*Classic Hits*-oldies	G5, 21	8.10/8.30 (DS)
SuperAudio–*Prime Demo*-mellow rock	G5, 21	5.22/5.40 (DS)
Shortwave Broadcasters via Satellite		
C-SPAN Audio 1: Various shortwave broadcasters	C3, 7	5.20
C-SPAN Audio 2: British Broadcasting Corporation (BBC)	C3, 7	5.41
Deutsche Welle	GE1, 22	7.38, 7.56, 7.74, 7.92
RAI Satelradio Italy (Italian)	G7, 14	7.38
WEWN–Worldwide Catholic Radio, Vandiver, AL	G1R, 11	5.40, 7.20, 7.38 (English), 5.58 (Spanish)
WHRA Africa/Middle East–World Harvest Radio, South Bend, IN	G6, 15	7.82
WHRI Americas–World Harvest Radio, South Bend, IN	G6, 15	7.46
WHRI Europe –World Harvest Radio, South Bend, IN	G6, 15	7.55
KWHR Asia–World Harvest Radio, South Bend, IN	G6, 15	7.64
KWHR South Pacific–World Harvest Radio, South Bend, IN	G6, 15	7.73
World Radio Network: WRN1 North America	G5, 6	6.80
World Radio Network: WRN2 North America	G5, 6	6.20 (Multi-lingual)
Speciality Formats		
Aries In Touch Reading Service	C4,10	7.87
Colorado Talking Book Network	C1,3	5.60
SuperAudio–Big Bands (Sun 0200-0600 UTC)	G5, 21	5.58/5.76 (DS)
Weather Channel–background music	C3, 13	7.78
Wisdom Radio Network	GE1, 12	7.10
	GE1, 12	7.92
Yesterday USA–nostalgia radio	G5, 7	6.80
Sports Programming		
Arkansas State Indians Radio Network	G6,6	7.38
Talk Programming		
American Freedom radio network	S4, 19	5.80
American Urban Radio Network	GE3, 9	6.30, 6.48
Amerinet Broadcasting	G1R, 17	5.58
Business Radio Network	C4, 10	8.06
For the People radio network	C1, 6	7.50
Friday Night Live (Fridays)	GE1, 12	5.70 (N)
KRLA-AM (1110) Los Angeles, CA	C1, 7	7.38
Orbit 7 Radio Network	C1, 14	7.48
Republic Radio International	G7, 14	7.70
Talk America Radio Network #1–talk programs	GE3, 9	6.80
Talk America Radio Network #2–talk programs	GE3, 9	5.41
Talk Radio Network (TRN)	C1, 14	5.80
Truth Radio	S4, 19	7.58
TVRO.NET (featuring Keith Lamonica)	S4, 16	5.80
United Broadcasting Network	C1, 2	7.50
W0KIE Radio Network	GE1, 12	5.70 (N)
WWTN-FM (99.7) Manchester, TN–news and talk	G5, 18	7.38
Variety Programming		
CBM-FM (88.5) Montreal,PQ Canada–variety/fine arts	E2, 1	6.12
KBVA-FM (106.5)Bella Vista, AR,ID-*Variety 106.5*	G6, 6	5.58/5.76 (DS)
WNMX-FM (106.1) "Mix 106" Waxhaw, NC	G1R, 17	7.927
WUSF-FM (89.7) Tampa-St.Petersburg, FL (Public Radio)	C4, 10	8.26

AUDIO SUBCARRIERS / SCPC SERVICES

FM SQUARED (FM²) AUDIO GUIDE

GE-3 Transponder 13 (C-band)

Ambassador Inspirational Radio	4.47 and 4.65 MHz
Blank audio carriers	1.05 and 3.57 MHz
Focus on the Family	1.23 and 1.41 MHz
Information Radio Network	3.39 MHz
International Broadcasting Network (IBN)	4.83 MHz
USA Radio Network	4.30, 5.01 and 5.20 MHz
Various Religious Programs (no common ministry)	.33 and 3.75 MHz
VCY/America (channel 1)	.51 MHz
VCY/America (channel 2)	.78 MHz

GE-3 Transponder 17 (C-band)

Blank audio carriers	1.28 and 3.57 MHz
Data Transmission	.80, 1.14, 1.21, and 2.06 MHz
Focus on the Family	1.05 and 1.40 MHz
In-Touch Ministries	4.47 MHz
Salem Satellite Network	4.65, 4.84, 5.01, and 5.20 MHz
SRN News	.33 MHz
USA Radio Network	1.77 MHz

Galaxy 3R Transponder 3 (Ku-band)

Blank Audio Carriers	.15, 2.06, and 3.14 MHz
Data transmissions	.06, .62, 2.93, 3.07 and 3.17 MHz
AP Network News	3.53 MHz
In-Store audio network ads (various companies)	.62, .71, .81, .88, .98, 1.05, 1.15, 1.26, 3.25, 3.44, 3.62, 3.70, 3.80, 3.88, 3.97 and 4.20 MHz
Muzak Services	.27, .39, .51, 1.36, 1.48, 1.60, 1.72, 1.84, 1.96, 2.19, 2.31, 2.44, 2.56, 2.68, 2.80, 3.34, 4.08, 4.34, and 4.45 MHz

Galaxy 3R Transponder 16 (Ku-band)

Data transmissions	.64, 1.95, 2.18, 2.40, 2.52, 2.73, 2.82, 2.92, 3.20, 3.47, 3.73, 3.97, 4.14, and 4.24 MHz
In-Store audio networks	.15, .27, .39, .99, 1.11, 1.59, 1.71, and 1.83 MHz

Telstar 5 Transponder 28 (Ku-band)

Data Transmissions	.06, .15, .23, .30, .35, .38 .47, .57, .65, .71, .74, .76, .84, .89, .93, .96, 1.05, 1.12, and 1.22 MHz

Single Channel Per Carrier (SCPC) Services

By Robert Smathers
roberts@nmia.com

An SCPC transmitted signal is transmitted with its own carrier, thus eliminating the need for a video carrier to be present. Dozens of SCPC signals can be transmitted on a single transponder. In addition to a standard TVRO satellite system, an additional receiver is required to receive SCPC signals.

The frequency in the first column is the 1st IF (typical LNB frequency) and the second column frequency (in parentheses) is the 2nd IF (commercial receiver readout) for the SCPC listing. Both frequencies are in MHz.

GE-2 Transponder-Vertical 13 (C-band)

1179.40 (80.6)	NASA space shuttle audio

GE-3 Transponder-Horizontal 13 (C-band)

1207.90 (52.1)	Wisconsin Voice of Christian Youth (VCY) America Radio Network–religious programming
1204.25 (55.75)	Wisconsin Voice of Christian Youth (VCY) America Radio Network–religious programming
1201.50 (58.5)	Wisconsin Voice of Christian Youth (VCY) America Radio Network–religious programming
1201.30 (58.7)	Wisconsin Voice of Christian Youth (VCY) America Radio Network–religious programming

Galaxy 6 Transponder 1-Horizontal (C-band)

1443.80 (56.2)	Voice of Free China (International Shortwave Broacaster) Taipei, Taiwan
1443.60 (56.4)	KBLA-AM (1580) Santa Monica, CA–*Radio Korea*
1443.40 (56.6)	Voice of Free China (International Shortwave Broadcaster) Taipei, Taiwan
1438.30 (61.7)	WWRV-AM (1330) New York, NY–Spanish religious programming and music, ID–*Radio Vision Christiana de Internacional*

Galaxy 6 Transponder 3-Horizontal (C-band)

1404.80 (55.2)	KOA-AM (850)/KTLK-AM (760) Denver, Colo–news and talk radio/Broncos NFL radio network/Colorado college sports
1404.60 (55.4)	WGN-AM (720) Chicago, IL–news and talk radio/Northwestern college sports
1404.40 (55.6)	Illinois News Network/WMVP-AM (1000) Chicago, IL–"ESPN Radio 1000



SINGLE CHANNEL PER CARRIER (SCPC) SERVICES

1404.20 (55.8) Tribune Radio Networks/Wisconsin Radio Network
1402.90 (57.1) USA Radio Network
1402.70 (57.3) WLAC-AM (1510) Nashville, TN–news and talk/*Road Gang* trucker program (overnight)/Tennessee college sports
1402.20 (57.8) NorthWest Ag News Network - Agriculture info for the Pacific Northwest
1402.00 (58.0) Occasional audio
1401.80 (58.2) For the People Radio Network with Chuck Harder – talk radio format
1401.50 (58.5) Agrinet Ag info/USA Radio Network
1399.00 (61.0) Sports Byline USA/Sports Byline Weekend
1398.80 (61.2) Talk Radio Network (TRN) – talk radio format
1398.50 (61.5) Occasional audio
1398.30 (61.7) WSB-AM (750) Atlanta, GA– news/talk
1397.80 (62.2) Occasional audio
1397.50 (62.5) Minnesota Talking Book Radio Network–reading service for the blind
1397.10 (62.9) Wisconsin Radio Network/Wisconsin college sports/Packers NFL radio network
1396.90 (63.1) Dallas Cowboys Spanish Radio Network (occ)
1396.70 (63.3) Radio America Network/Business News Network
1396.40 (63.4) Georgia News Network (GNN)–network news feeds
1395.80 (64.2) WTMJ-AM (620) Milwaukee, WI–talk radio/Packers NFL radio network
1395.60 (64.4) WGST-AM/FM (640/105.7) Atlanta, GA ID *Planet Radio*–news and talk radio/Falcons NFL radio network
1395.40 (64.6) Michigan News Network–network news feeds/WPLT-FM (96.3) Detroit, MI
1395.00 (65.0) Occasional audio
1394.70 (65.3) WJR-AM (760) Detroit, MI–news and talk radio/Michigan News Network
1394.30 (65.7) Michigan News Network – network news feeds/Michigan State college sports
1385.40 (74.6) WDUQ-FM (90.5) Pittsburgh, PA – Jazz format
1385.00 (75.0) Occasional audio
1384.60 (75.4) WDUQ-FM (90.5) Pittsburgh, PA – Jazz format
1384.40 (75.6) KOA-AM (850)/KTLK-AM (760) Denver, CO–news and talk radio/Broncos NFL radio network/Colorado college sports
1384.20 (75.8) WSB-AM (750) Atlanta, GA – news/talk
1383.10 (76.9) KIRO-AM (710) Seattle, WA–news and talk radio
1382.60 (77.4) Soldiers Radio Satellite (SRS) network–U.S. Army information and entertainment radio/Army college sports
1382.30 (77.7) Motor Racing Network (occasional audio) NASCAR racing
1382.00 (78.0) Occasional audio
1381.60 (78.4) KEX-AM (1190) Portland, OR–news and talk radio
1381.40 (78.6) Occasional audio/Westwood One radio sports
1381.20 (78.8) KJR-AM (950) Seattle, WA– sports talk radio/Washington State college sports
1377.10 (82.9) In-Touch–reading service
1376.00 (84.0) Kansas Audio Reader Network–reading service

Galaxy 6 Transponder 6-Vertical (C-band)

1347.00 (53.0) WCRP-FM (88.1) Guayama, PR–Spanish language religious programming

Anik E2 Transponder 1-Horizontal (C-band)

1446.00 (54.0) Canadian Broadcasting Corporation (CBC) Radio–North (Quebec) service

Anik E2 Transponder 5-Horizontal (C-band)

1366.00 (54.0) Canadian Broadcasting Corporation (CBC) Radio–North (Eastern Arctic) service

Anik E2 Transponder 7-Horizontal (C-band)

1326.00 (66.0) Canadian Broadcasting Corporation (CBC) Radio–North (MacKenzie) service
1325.50 (65.5) Canadian Broadcasting Corporation (CBS) Radio–Occasional feeds/events

Anik E2 Transponder 17-Horizontal (C-band)

1126.00 (54.0) Canadian Broadcasting Corporation (CBC) Radio–North (Western Arctic) service
1125.50 (54.5) Canadian Broadcasting Corporation (CBC) Radio–North (Newfoundland and Labrador) service

Anik E2 Transponder 23-Horizontal (C-band)

1006.00 (54.0) Societe Radio-Canada (SRC) Radio–AM Network
1005.50 (54.5) Canadian Broadcasting Corporation (CBC) Radio-North (Yukon) service

Solidaridad 1 Transponder 1-Vertical (C-band)

1447.90 (52.1) Antenna Radio Noticias
1447.60 (52.4) Antenna Radio Noticias
1447.20 (52.8) La Grande Cadena Raza

Anik E1 Transponder 21-Horizontal (C-band)

1036.70 (63.3) In-store music
1037.00 (63.0) In-store music
1037.50 (62.5) In-store music

SBS5 Transponder 2-Horizontal (Ku-band)

1013.60 (80.4) Wal-Mart in-store network
1013.20 (80.8) Wal-Mart in-store network
1012.80 (81.2) Sam's Wholesale Club in-store network
1004.50 (89.5) Wal-Mart in-store network
1004.00 (90.0) Wal-Mart in-store network
1003.60 (90.4) Sam's Wholesale Club in-store network
1003.20 (90.8) Wal-Mart in-store network

RCA C5 Transponder 3-Vertical (C-band)

1404.60 (55.4) Wyoming News Network–network news feeds
1400.60 (59.4) Learfield Communications/Stan Solomon Talk Show (occ)/Indiana college sports
1400.40 (59.6) Learfield Communications/MissouriNet/Rams NFL radio network
1400.20 (59.8) Occasional audio
1400.00 (60.0) Learfield Communications/Stan Solomon Talk Show (occ)/Purdue college sports
1396.60 (63.4) Kansas Information Network/Kansas Agnet–network news feeds
1396.40 (63.6) Liberty Works Radio Network – talk radio
1396.20 (63.8) MissouriNet
1396.10 (63.9) MissouriNet
1395.90 (64.1) Western Montana Radio Network/Red River Farm Network
1395.70 (64.3) MissouriNet
1386.40 (73.6) Learfield Communications/Chiefs NFL radio network
1386.20 (73.8) Radio Iowa/Iowa college sports
1384.60 (75.4) Capitol Radio Network
1384.00 (76.0) Occasional audio/ABC Direction Network–network news feeds
1383.80 (76.2) Occasional Audio
1383.40 (76.6) Capitol Radio Network
1382.90 (77.1) MissouriNet
1382.50 (77.5) Virginia News Network–network news feeds/
1382.10 (77.9) Learfield Communications/MissouriNet

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Your DVB Questions Answered

Over the last couple of months I've reviewed a number of digital video broadcast (DVB) satellite receivers and written extensively about programming, both video and audio, which is available on dozens of satellites in the free-to-air (FTA) mode. A lot of *MT* readers were paying attention because you loaded up my E-mail with some excellent questions about DVB reception. This month we'll look at some of the issues regarding this fascinating aspect of satellite TV DXing.

New Life For Primestar Gear?

John Corby from Toronto, Canada, writes "...I am a satellite TV 'scrounger.' I have been accumulating bits and pieces from hamfests, auctions and friends for a while. Among my collection I have a brand new Canadian Ku-band dish from ExpressVu, and a similarly new Echostar 3000 MPEG2 receiver from the ...DISH Network. Is there any possibility that I will be able to receive any in-the-clear signals from any of the broadcast satellites using these two pieces..?"

Similarly Kevin Short writes, "...I've just recently switched from Primestar to DirecTV, and I was wondering if the Primestar dish and LNB could be used to receive other Ku-band satellite transmissions? Since Primestar used the DigiCipher system, can the Primestar receiver be used to receive other DigiCipher signals on satellite...? I was also wondering if an MPEGII/DVB receiver could be used with the Primestar dish to receive other DVB ... transmissions ... on Ku-band?"

There are a number of things that the DBS services do differently than the regular C and Ku-band services. First, the DBS services use LNBs with different frequency capabilities. For example, regular Ku-band services are downlinked in the 11.7 to 12.2 GHz range, while DirecTV on their DBS satellites use 12.2 to 12.7 GHz as does the competition DISH Network on their Echostar satellites.

The original Primestar systems used old Satcom K1 at 85 degrees west and tuned them in on BMAC digital receivers. Later the service switched to the Ku-band side of newly launched GE-2 and signed on with General Instrument's DigiCipherII technology. In so doing they went from 45 watts per channel on K1 to 60 watts per channel on GE-2. Still, this is considered a medium power in the DBS game and required Primestar to continue to use dishes considerably larger than those of DirecTV and DISH which have transponders pumping out 120 to 130 watts. Their original plan to move to a brand new, high power DBS satellite of their own was made unnecessary when DirecTV bought them out earlier this year.

There is also the polarization factor to consider. Primestar used linear (i.e. horizontal/vertical) polarity while the DBS services transmit circularly polarized signals. And, finally, there's the issue of receiver parameters. DVB receivers allow the user to change transponder settings such as frequency, symbol rate and in some cases Forward Error Correction (FEC) as well as audio and video PIDs (packet IDs). The DBS receivers were "plug 'n' play" with no provision to change the receiving parameters.

The upshot is that Primestar dishes and LNBs may provide some experimental satisfaction. The drawback is the smaller dish. The big advantage is that there ought to be tons of old Primestar systems floating around flea markets and hamfests at giveaway prices. My advice is, don't refuse one if it's given to you and see what you can do with it. Hook it up to a hamfest analog Ku-band receiver and go hunting in the Clarke Belt for signals on the cheap. Just don't pay more than a few bucks for any of it and don't expect miracles.

The DVB Receiver Right For You

Steve Simon from Ohio writes, "...I'm trying to figure out which DVB receiver to buy. I've done some searching, but have been completely overwhelmed...I've a 12 ft. dish and 180 degree sweep (of the horizon)...I like the idea of 'SWL for TV'. I'm not after the movies, but more for the programs in the European areas, news, wild feeds, stuff like that. Which system would you recommend?"

Well, it's a really great question. It's the same question we face when it comes to purchasing anything in the electronics realm, from scanners and shortwave radios to satellite receivers and computers. There are a couple of things to consider. 1) Is price a factor? 2) is "user friendly" a top priority? And 3) What features are the most important to you?

The price issue is easy to figure. Call dealers or visit the websites of the various providers and compare the prices offered. Shop around. You may find the same make and model at a much lower price from one dealer than another. If you're shopping for price alone the winner will be only too obvious.

If you're concerned about ease of operation, you'll want the one most easy to program. All MPEGII receivers require the user to punch in numbers for each "bouquet" of digital channels. Some are sold with the latest numbers of MPEGII channels preloaded. But, MPEGII channels change all the time. Sooner or later you'll have to do the programming yourself which, while time consuming, is not hard.

Main features are just about the same for all of these receivers, but there are differences in the little things. One really handy item is a "favorites" list which allows the user to go directly to his top 10 or so channels instead of having to page through 300 channels looking for the one he wants to watch. Keep in mind, too, that receiver designs are constantly updated and new features are piled on as soon as the engineers can execute the design.

For consumers interested in the many audio services, pay attention to how the audio services are accessed. Some require the viewer to switch to a separate list for radio services and proceed from there, while others allow access to audio services directly on the video channel being watched.

One thing is for sure, with Steve's 12-ft dish and horizon-to-horizon view he won't miss much! While it's possible to view DVB signals on Panamsat 5 with a C-band dish as small as 4.5 ft, the bigger the dish, the more the gain. This is particularly important with digital transmissions on C-band satellites with minimal output wattage.

What's the Hook-up?

Jim Richardson from out west writes, "...I have my MPEGII receiver on order and...was considering setting it up through my VCR...but had a few questions and wondered also if that was the best way to do it."

Jim, there are several ways to add a DVB receiver to your current satellite TV system. Most DVB receivers allow you loop the signal from the LNB into the DVB receiver first (*see diagram A*) and then out from the

DIAGRAM A

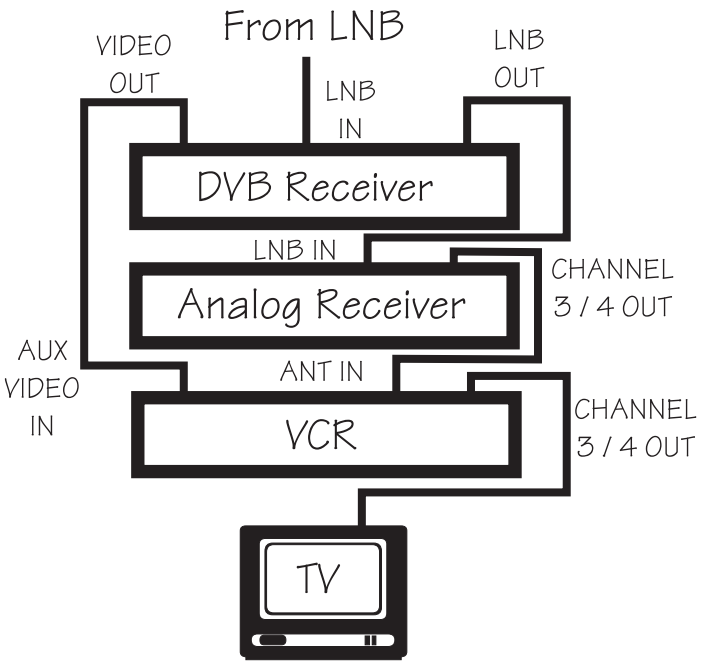


DIAGRAM B

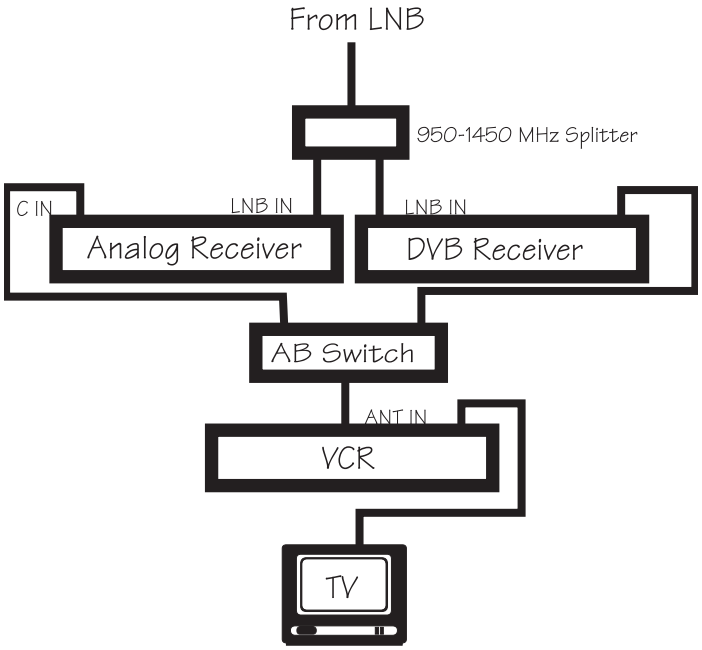
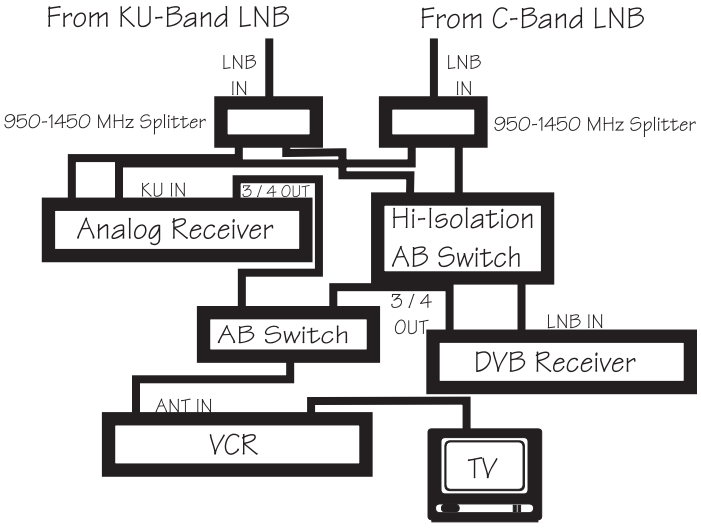


DIAGRAM C



DVB into your analog receiver. The reason for all this loopiness is that DVB receivers have no way to drive the dish. So, this way makes your analog receiver the "master" and the DVB receiver the "slave," i.e., it can only tune whichever satellite the analog receiver is looking at. If you're like me, you may be powering as many as four receivers off the one LNB on the dish. In this case, you'll need an amplified splitter and four pieces of coax to reach the various receivers.

Once you have the LNB connected you'll need to take the video out from the DVB receiver and connect it to a VCR or TV set for viewing. My first recommendation is to use the single RCA "video out" connection on the back of the DVB receiver and plug it into the "video input" of your VCR. Now by pressing the "aux" or "input" button on your remote you'll bring in the channel 3/4 modulator of your DVB receiver. Since many DVB receivers come with a three wire RCA connector patch cord just for this purpose, it's also the cheapest way.

Another method is to go to Radio Shack and pick up an A/B video switch (RS#15-1247 for $4.99) and three short lengths of 75 ohm coax with connectors attached (about $4 each). Take one cable and connect the output of your analog satellite receiver (*see diagram B*) to one of the inputs on the A/B video switch. Take another cable and connect the output of your MPEGII satellite receiver to the other input on the A/B video switch. Now take the third cable and attach it to the output of the A/B video switch and connect it into your VCR where you had connected your analog satellite receiver before.

Now, simply by flipping the A/B video switch from "A" to "B", you'll be feeding the output of one or the other satellite receivers into your VCR. To change satellites, flip to "A", your analog receiver, and send it to whichever satellite you want to watch DVB video. Once your dish is on the satellite, flip the switch to "B" and tune the desired channel. It's that simple.

In cases where you have C/Ku-band feeds (see diagram B) and only one "F" connector input for your analog receiver, you'll need another A/B switch (RS# 15-1233 for $6.99). Both C and Ku-band feed lines go into the input of this switch and one coax goes from the switch's output to the input of the DVB receiver and looped through to the analog receiver. Now, whichever band you're tuning, simply press the appropriate button on the switch and that band is now feeding the analog and DVB receiver. I put stick-on labels on the switch so I know which is which.

If you have a receiver which takes in both C and Ku-band feeds at once (*see diagram C*) it can get a little tricky. You'll need to have two 950-1450 MHz splitters and an A/B switch to send the C and Ku-band signals to both receivers and switch between them. Keep in mind that there will be some insertion loss from using all these splitters.

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That Pesky Propagation

I was at a hamfest recently and ran across a stack of old *CQ* magazines dating from 1953. It gave me an opportunity to have a pensive thought at the recent loss of editor Alan M. Dorhoffer K2EEK, but what also caught my eye was a two part series on *DX and the Sun*. (The July and August 1953 issues to be specific).

It was interesting to see the science of propagation as it was understood over 45 years ago. It was also interesting to notice that this knowledge has only really advanced in just the last few short years, thanks to the newer "solar" satellites that have been circling the earth. The study of solar radiation and atmospheric propagation can be rather complicated. So much so that many beginners take great pains to ignore the subject in favor of general guesswork.

The truth is, a little bit of knowledge in this area can go a long way. Let's kick this subject around a bit and see if we can bring light to the darkness. (It's a bad line, but I just had to use it!)

Did you ever wonder how this whole radio thing really works? Somebody way off in Freedonia sends out a signal that somehow gets all the way to your little box on your table top. Furthermore, how come that guy in Freedonia can't just set his transmitter up on the same frequencies as your local AM station? And while we are at it, how come you can only hear Radio Free Freedonia during certain hours, on certain days, in certain seasons, even though the guy transmits 24 hours a day 365 days a year?

The answer can be summed up in one word...PROPAGATION! Propagation is the science (and some would say witchcraft) of how radio waves travel between two points, often in spite of the world around them.

The reason your local AM broadcast station comes in loud and clear is because you are receiving its signals via **groundwave**. Essentially, this means that the station sends its signals out toward the horizon. Your happy home is in the path of these signals as they march toward the horizon. The signal just sort of bowls your receiver over. No muss, no fuss, no bother.

Back to Radio Freedonia. Freedonia is way over on the other side of the planet from you. You are no longer bathing directly in the radio waves' local path. Since it is essential to the continued political stability of Freedonia that its broadcast be heard in the United States, Radio Freedonia broadcasts in the shortwave frequency range. This allows for **skywave propagation**.

Freedonia's signals travel past its horizon line, bounce off the **ionosphere** and head back down toward earth and your receiver over on the other side of the globe. If you have ever played pool you might think of this as a "bank shot." Sometimes the signal even bounces off the earth and heads back up to bounce off the ionosphere again. This puts the signal even further away from its transmitter location.

The formal name for this bouncing is **refraction,** but you will hear people call it other things such as **skip** or **path** or plain old **bounce**. See why things can get complicated?

To use the pool table analogy again, the angle at which the radio signal hits the ionosphere directly affects where the signal will come down and be most clearly heard. So you think this would make it real easy for the stations. All they would have to do is set up antennas that would give them just the right "bank shot" to get the signal where they want it to go.

To a certain degree, this is done. However, the ionosphere changes the rules of the game by changing the height at which the signal will refract back down to earth. Imagine lining up a perfect pool shot only to have someone move the bumper back a foot right after you hit the cue ball. Consequently, the science of predicting how the ionosphere is going to react becomes important to both the transmitter and receiver.

The Ionosphere

Okay, so just what is this ionosphere thing anyway? The earth is surrounded by a big ball of gases. This gas ball extends up more than 1200 kilometers (although I would not want to try breathing up that high). The area that ranges between 60 and 1200 kilometers (km) is generally considered the ionosphere. What happens is that the gases between these altitudes become "ionized" by the **ultraviolet radiation** from the sun. The more radiation the more ionization occurs. So it is easy to see that the ionosphere will be more densely ionized over the part of the world that is exposed to sunlight at any given time.

Now comes the tricky part. If the ionosphere is very dense, too much of the transmitted signal will be absorbed and not enough signal will get back to earth to be heard acceptably. This would be like a pool table with really mushy cushions. On the other hand, if the ionization is not dense enough, the transmitted signal will not refract as desired; instead it would head off into space. In this view the pool table's cushion would be gone and the ball would head right off the table and keep on going all the way to Alpha Centauri. (Well, I guess we've run the distance on the old pool table analogy.)

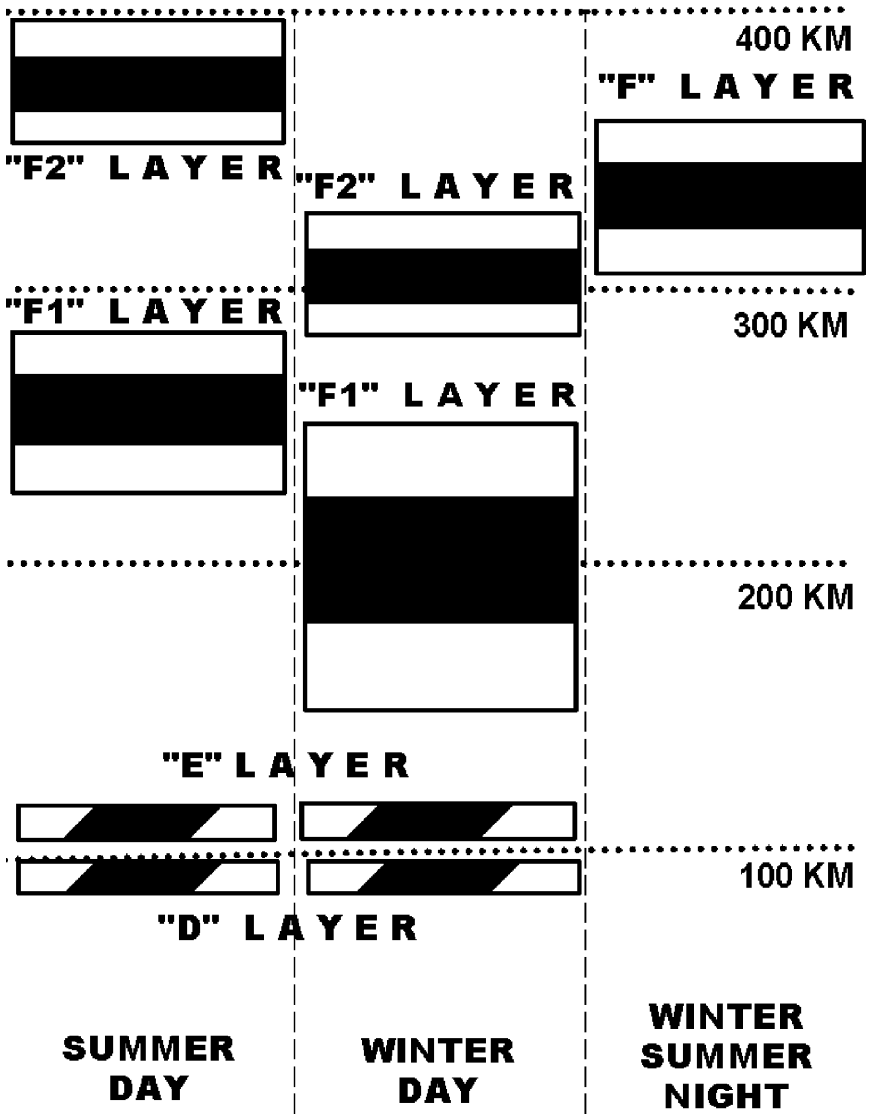
Toss in the fact that the altitude at which refraction occurs also varies with ionization density and you can see why the science of propagation may seem about as accurate as tabloid newspaper astrology. However, with almost a century of both professional and amateur propagation prediction under our belts, certain discoveries have allowed radio people to make pretty good predictions about when and where to listen to hear just about anything they want to hear.

Over the years we have come to know patterns of ionospheric density that give us a clearer understanding of propagation. You can imagine these patterns as layers. The layer closest to earth would be "A", and as we move out from the earth we would encounter "B", "C", "D", etc. For our purposes we don't even have to sweat A through C. The radio person's worries start at layer "D" and go up through layer "F".

"D" Region

If you wonder why you can only hear your favorite shortwave broadcasters in the evening and not at high noon, you can blame the D layer. This region is usually between 50 and 100 km above the earth. Its ionization is very low at night but it becomes very densely ionized during daylight. So dense, in fact, that it absorbs any signals below 7000 kHz, effectively blocking most long distance shortwave communication.

Remember how I said this ionization process was related to the sun? Whenever there occurs a period of intense solar activity in the form of solar flares, the D layer can become so highly ionized that it can blank out *all* radio frequencies, leaving only local groundwave communication possible. So the best time to listen for your favorite SW broadcaster is during the hours when both you and that station are in relative darkness, thereby minimizing the negative effects of D layer absorption. Shine a flashlight on a world globe and



A smplified diagram of ionospheric layers by Jacques d'Avignon

you can get an idea of how this might work.

"E" Region

The E layer runs between 100 and 160 km and is responsible for most radio wave reflection. What makes this layer interesting is that it becomes effectively weaker at night. Practically, you can think of it rising up to meet the F region. So, if the E layer refracts radio signals at 100 km high during daylight and this layer rises as the night goes on to about 160 km, the angle that a signal will hit the refractive layer will change greatly. Too steep of an angle and the signal travels up and is absorbed or maybe even punches through into space. The lower the angle of refraction, the greater distance the signal can travel.

This layer's actual height changes with the season and with solar activity. This is why many shortwave stations will usually make frequency changes on the first Sundays of March, May, September and November.

One curiosity about the E layer is that, although it effectively rises to meet the F layer at night, areas of the E layer can remain low enough and dense enough to affect communication, creating an effect known as **sporadic "E" skip**. These clouds of ionized particles can allow for unusually long distant reception of FM and TV signals from around May through July in the United States. This also accounts for some long range scanner and VHF amateur radio communications, as reported in last month's cover story.

"F" Region

Out there between 160 and 320 km, the F layer represents the last layer of the ionosphere that normally refracts shortwave signals. Actually, I should say "layers" because during daylight hours this layer splits into two distinctive layers at around 200 km. These are referred to by propagation pundits as F1 and F2.

Okay, so what does all of this mean in terms of hearing those stations you may want to hear? Think of it this way. After the sun goes down, the D layer no longer blocks long range communication, and the E layer rises to meet the F1 and F2 layers that have combined into a single F layer around 250 km above the earth. This overall process is predictable enough to allow stations to plan frequency and antenna patterns to create maximum effective communication over desired distances.

The plus for the DXer is that variations in refraction angles and multiple hop signals can allow you to hear stations at distances greater than their intended target audiences.

By regularly monitoring the seasonal variables and patterns of solar activity, a dedicated DXer can even go hunting for stations he or she is not supposed to be able to hear under normal conditions.

If you are anything like I was when I first started to monitor shortwave signals, you probably don't feel like spending many hours researching propagation patterns that could be better spent twisting the dials and hearing stations. To be honest, the real advantages of indepth propagation analysis only bear fruit as you move into more specialized listening habits.

As a beginner and even an intermediate level SWL, you have everything you need to know about propagation right in your hot little hands. *Monitoring Times* has done some of the work for you. Jacques d'Avignon's "Propagation Conditions" column gives you a great deal of information about what frequencies are ideal for listening at different times and between different places.

We haven't even taken a look at tracking sunspot cycles and half a dozen other factors that can affect your listening. But don't get too bent out of shape. You have the rest of your life to doodle around with propagation. There are dozens of books to absorb and theories to experiment with. Have fun!

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More on GOES-East

Although large areas of western Europe were cloudy during the total eclipse of the sun over Europe on August 11, 1999, it was still an interesting spectacle for those with access to weather satellite monitoring equipment. EUMETSAT provided a near-continuous feed of pictures from Meteosat-6, showing the Moon's shadow crossing Earth, via its Internet site. Meteosat-7 also obtained images as part of its normal operational schedule. My experience of the eclipse appears in last month's *Monitoring Times* on page 100.

For further information and archived pictures, visit EUMETSAT:
http://www.eumetsat.de

As well as information on the status of the polar orbiters, a second detailed look at the GOES-East transmission schedule is included this month.

Operational WXSATs

After a few weeks "rest," Meteor 3-5 was commanded back on, transmitting automatic picture transmission (APT) on 137.30 MHz from the end of August – see figure 1. Rest periods are sometimes scheduled during the satellite's orbital plane's passage through the "twilight zone," the region where solar illumination is low enough to affect the power available from the solar panels. If a satellite tracking program is used to predict future passes, Meteor 3-5's orbital plane can be seen to precess, crossing zones of low solar illumination at regular intervals.

During the current phase of its daytime passes over Europe and America, Meteor 3-5 is passing north-bound. Figure 1 shows north-west Africa, Spain, France and Britain, with a weather front approaching eastwards from the Atlantic.



FIG 1: *Meteor 3-5 1552 UTC 6 September, 1999*

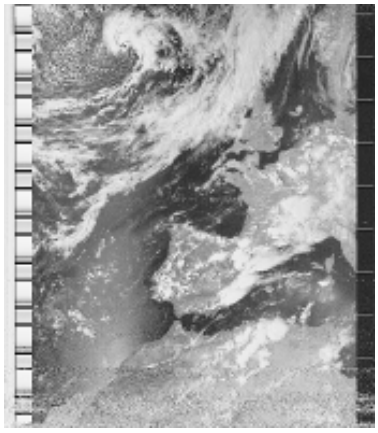


FIG 2: *NOAA-14 1517 UTC 6 September, 1999*

By coincidence, NOAA-14 made its north-bound pass shortly before Meteor 3-5, covering a similar swath. Note the similar regions covered, but the different wavelength sensitivities.

Resurs 01-N4

This WXSAT (weather satellite) has continued transmitting on 137.85 MHz from sun-synchronous orbit. It transmits during most of the night-time portions of its orbit, though the current positioning of my WXSAT antenna has prevented my monitoring the satellite at lower elevations.

I have recently had a reorganization of my antennas, and final modifications to the new mast were completed this week. The new WXSAT aerial (a quadrifilar helix antenna) is now mounted on the roof, and a loop yagi and log periodic will be positioned at the top of the new mast, from where the yagi should have near line-of-sight vision to GOES-8 (at about three degrees elevation, due west and no bushes!)

NOAA operations

NOAA-12, NOAA-14 and NOAA-15 are all in sun-synchronous orbits, with separated orbital planes. NOAA-14 is our "early afternoon ascending" weather satellite, providing us with daily images of local weather around 2 p.m. local time (1400 UTC in Britain). NOAA-12 and NOAA-15 provide us with "morning descending" imagery – NOAA-12 first, and NOAA-15 a little later. However – there is a complication!

The Kepler elements for NOAA-12 and NOAA-15 show that they have similar orbital periods – 14.230908 for NOAA-12 and 14.229740 for NOAA-15 (rounding down). The (small) difference in these periods has a profound long-term effect. NOAA-12 covers slightly more orbits per day than NOAA-15, so – periodically – it catches up and overtakes NOAA-15, transmitting on the same frequency. Not surprisingly, this situation can be anticipated in advance and planned for. On this occasion, NOAA managers have decided to switch NOAA-12's APT off.

News confirming this was released just after last month's deadline for *View from Above*. "On September 15, 1999, the NOAA-12 APT transmitter will be turned off for an indefinite period. The two orbits have brought the satellites to close proximity to each other and both are within the local reception circle. Both satellites transmit APT on 137.50 MHz, and the majority of APT ground stations use omnidirectional antennas; consequently the simultaneous reception of both transmissions would cause interference between the signals.

"NOAA-15 is the operational morning satellite, while NOAA-12 is a stand-by satellite. Also, the AVHRR imaging instrument on NOAA-15 has split gain capabilities on the visible channels, and provides improved low light imaging for both HRPT and APT. NOAA-12 will resume APT transmissions on an indefinite future date when there is sufficient separation with NOAA-15."

Transmissions of high resolution picture telemetry (HRPT) are not affected because it is received in the 1700 MHz band, requiring a tracking dish – and this reduces the probability of mutual interference.

Meanwhile, a decision and announcement concerning resolution of the NOAA-15 HRPT antenna problems was expected at press-time.

Okean-O

Most unexpectedly, no transmissions have been reported (on 137.40 MHz) from this new oceanographic satellite. It has become fairly common practice, following previous Okean launches, that within a few days, short (possibly test) transmissions would be reported from passes over western Europe.

Short-term data outages from GOES

Providing an uninterrupted service from any satellite is a challenging job; sometimes there has to be a pause while essential short-term natural processes – such as eclipses – happen. Across the Atlantic, the European WXSAT Meteosat-7 experiences an occasional scheduled hiccup when it enters eclipse.

From August 15 through October 30, GOES spacecraft imaging and sounding operations are interrupted around spacecraft midnight for instrument sun avoidance and eclipse operations. Images (0830 through 0930 UTC) and soundings (0901 and 0924 UTC) are cancelled for GOES-10. During GOES satellite outages, the other satellite provides full disc imaging to provide continuing operational support. Full details are available from *Satellite Operations Control Center*, NOAA/NESDIS.

Routine operational information can be obtained from the site:
http://www.ssd.noaa.gov/

GOES WEFAX

Last month I started a series of features looking at the transmissions scheduled from GOES-8. The idea of this feature is to help newcomers to the world of weather satellite monitoring to understand what sort of images are available from GOES satellites and the type of equipment required for their reception. GOES-8 is the current WXSAT occupying the GOES-east slot at 74 longitude. A few notes about GOES-E helps to put the transmissions in perspective.

The satellite provides a considerable amount of data, including two image streams. One stream (WEFAX, weather facsimile) comprises a sequence of pictures taken by its own "imagers" (or sensors), supplemented by comparable images from other international WXSATs. A second data stream carries high resolution imagery in Primary Data (non-WEFAX) format.

Other systems include the Sounder (for providing data to determine the vertical temperature and moisture profile of the atmosphere, surface and cloud top temperatures, and ozone distribution). The Space Environment Monitor (SEM) measures particle fluxes, the Data Collection System (DCS) monitors earth-based buoys, and the Search and Rescue (SAR) Transponder has saved many lives through its automatic monitoring of specific distress frequencies.

The first decision likely to face the newcomer to this hobby is whether to go (initially) for GOES telemetry or for polar orbiter images. The equipment required for each type of satellite is different – but compatible. Each requires a unique antenna and receiver because of the different frequency bands used. Polar orbiters use the 137 MHz band; GOES (and most similar geostationary WXSATs) use the 1691 MHz band. This means that in certain locations where more than one geostationary WXSAT is above the horizon, both can probably be accessed with minimal, if any, modifications being required.

GOES image sequences

The transmission schedule for GOES-E wefax shows many types of images. Several originate from GOES-10 (the GOES-West satellite), several from the European METEOSAT-7, some reconstructed composite images from NOAA-14 (see figure 3), a few administrative messages, a number of charts of various types, but the majority of course, are from GOES-E.

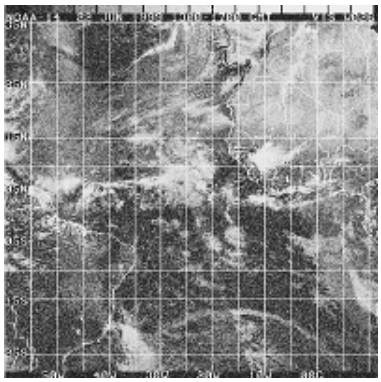


FIG 3: ***W026 – a NOAA-14 composite image***

Image sequences usually run in sets; one set of NOAA-14 images runs from 0210 until 0230 UTC, comprising composite images in infrared and visible-light. A further series runs from 0514 to 0558 UTC. A fascinating series of ice charts run between 0240 and 0300 UTC – samples will be shown at a later date. Meteorological charts form another series, also transmitted in batches during the day.

Last month I started with the first image transmitted after midnight (0000 UTC), a GOES-10 picture. A sequence from METEOSAT-7 follows, then a further GOES-10 format, followed by more infrared images from METEOSAT-7. The first GOES-E image of the new day is transmitted at 0046 UTC – the northern hemisphere infrared format, originating almost one hour earlier at 2345 UTC.

Subsequently, this image format (GOES-8 NH IR) is transmitted at about hourly intervals from a scan taken during the previous hour. Software animation is possible. Most WXSAT software includes a facility to animate specific sectors of the globe. In this way, the likely movement of vigorous weather systems – such as tropical storms – can be estimated, or at least monitored.

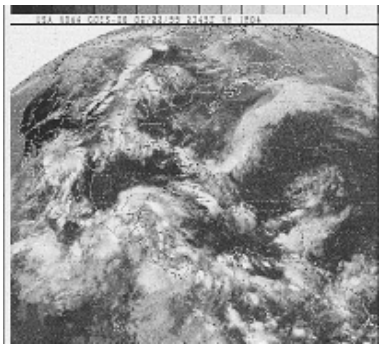


FIG 4: ***GOES-8 2345 UTC June 22, 1999, northern hemisphere infrared (NH IR)***

WEFAX images include U.S. state outlines, so the geographical location of weather systems can be identified. Careful examination of the image indicates that different cloud layers can be identified according to their relative temperatures. Cold clouds tend to be higher than the warmer, often rain-bearing clouds. Animating weather systems often shows the different layers to be moving at different rates.

FREQUENCIES

NOAA-14 transmits APT on 137.62 MHz
NOAA-15 transmits APT on 137.50 MHz
NOAAs transmit beacon data on 137.77 or 136.77 MHz
Meteor 3-5 may transmit APT on 137.30 MHz when in sunlight
Resurs 1-4 transmits APT on 137.85 MHz
Okean-4 and Sich-1 sometimes transmit APT briefly on 137.40 MHz
GOES-8 and GOES-10 use 1691 MHz for WEFAX



Larry Van Horn, N5FPW
email: larry@grove-ent.com

The Civil Air Patrol

In last month's *MT Communications* column, we carried a report that the Civil Air Patrol (CAP) offices at Maxwell AFB, AL, were raided by the Air Force Office of Special Investigation and the FBI. Since that report the CAP has made the national news, and keeping with that increased exposure, it's time for *Milcom* to profile the radio frequencies used by this interesting and somewhat controversial U.S. Air Force auxiliary group.

HF ALLOCATIONS (UPPER SIDEBAND/PACKET)

All frequencies are in kilohertz

Northeast Region: 4466 Primary/4469 Secondary
Middle East Region: 4585 Primary/4582 Secondary
Great Lakes Region: 4604 Primary/4601 Secondary
Southeast Region: 4469 Primary/4466 Secondary
North Central Region: 4506 Primary/4509 Secondary
Southwest Region: 4627 Primary/4630 Secondary
Rocky Mountain Region: 4601 Primary/4604 Secondary
Pacific: 4585 Primary/4582 Secondary
Miscellaneous nationwide frequencies (all regions authorized): 2371 2374 7341 (Packet only) 7635 7920 14902 18205 20873 26617 26620

VHF ALLOCATIONS (MODES AS INDICATED, ALL CAP REGIONS)

Practice beacons	121.600 121.775
AM voice	122.900 123.100
FM Voice	143.750 143.900 148.125 148.1375 148.150 149.5375
Packet (data)	149.895 149.925

The 149.895 frequency for packet is authorized nationwide with the exception of certain areas near the Canadian border where 149.925 is used. No airborne use of 149.925 is permitted within CAP.

The Civil Air Patrol has an extensive VHF repeater/simplex network nationwide. Here are the common pairings and frequency usages of their VHF allocations.

148.125	Simplex (100 Hz PL*)	nationwide <channel 2>
148.125	Repeater output	143.750 repeater input
148.1375	Simplex (100 Hz PL)	nationwide <channel 3>
148.1375	Ground tactical simplex	
148.150	Simplex (100 Hz PL)	nationwide <channel 1>
148.150	Repeater output	143.900 repeater input
149.5375	Simplex (100 Hz PL)	nationwide <channel 4>
149.5375	Air-to-ground and air-to-air simplex	

* (private line tone)



Civil Air Patrol Cessna aircraft typically flown by the CAP. Photo courtesy of the CAP.

If you want to monitor some interesting listening from time-to-time, Civil Air Patrol can be fruitful, especially when you have a downed aircraft in your area or they are on a counternarcotics drug surveillance mission.

Des Moines International

Milcom regular Paul Bunyan provides the following frequency information on activity at the **Des Moines, Iowa, International Airport** (KDSM).

ATIS	119.550/251.050 (not 251.500)
Clearance Delivery	134.150/317.550
Ground Control	121.900/348.600
Tower	118.300/257.800
Approach/Departure Control	118.600/350.300, 123.900/307.150, 135.200/360.700
Iowa Air National Guard Ops	138.150/260.400 (132 Fighter Wing)
Air National Guard Air-to-Air	138.200 138.300 138.400 139.700 260.400
Miscellaneous Frequencies	40.450 41.450 138.900 140.000 140.700 142.200

The South Dakota Air National Guard (114FW) operations (callsign Lobo Ops) in Sioux Falls, SD, has changed its VHF frequency from 139.900 MHz (AM) to 138.100 MHz (AM). Paul also includes the following interesting intercepts. Thanks, Paul, for this fine update.

MIDWEST LOGGINGS

136.725 (AM)	SAM 50050 (C-20C) working SAM 56973 (C-137C) with good chit-chat.
139.350 (AM)	Sherman AAF Ops, Kansas (VHF 321.700 MHz)
143.875 (AM)	"Bat" air-to-air (F-16s)
143.925 (AM)	"Mint" air-to-air (F-16s)
149.350 (AM)	"Tulsa" air-to-air (F-16s)
150.050 (AM)	"Raleigh" air-to-air (C-141s)
235.050 (AM)	Have Quick (with 239.950 and ?)
239.950 (AM)	Have Quick (with 235.050 and ?)
240.150 (AM)	Cobra Ops – Offutt AFB, Nebraska
260.250 (AM)	Truman Military Operating Area (MOA), South Dakota (Primary)
298.250 (AM)	Lake Andes MOA, South Dakota (Primary)
300.100 (AM)	"Ascot" air-to-air (UK transport aircraft)
301.600 (AM)	Jayhawk Ops – McConnell AFB, Kansas
311.300 (AM)	Crypt MOA, Iowa (Primary)
314.400 (AM)	Lincoln MOA, Nebraska (Primary)
321.700 (AM)	Sherman AAF Ops, Kansas (VHF 139.350 MHz)
324.400 (AM)	AR-653 refueling anchor in Kansas (Primary)
352.975 (AM)	O'Neill MOA, Nebraska (Primary)

Have Quick Frequencies

Paul mentioned a couple of HQ frequencies in his list above. Have Quick is a jam-resistant frequency hopping system used by the U.S. Air Force, U.S. Army, U.S. Navy and NATO forces and is found in the 225-400 MHz military aircraft band.

Here is a list of possible Have Quick frequencies provided by several *MT Milcom* readers.

DOD HQ FREQUENCIES

225.150 227.150 235.050 239.850 (HQ timing burst) 239.950 252.925 257.250 262.450 264.400 (Possible HQ timing) 267.850 271.950 279.750 284.150 287.350 287.400 287.450 289.050 293.550 297.575 297.600 298.650 302.275 308.750 314.275 314.300 314.450 314.600 (tentative timing burst) 341.750 (HQ timing burst) 359.075 359.100 375.725 375.825 375.925 375.975 376.000 376.025 376.125 376.225

NATO HQ FREQUENCIES

232.400 267.775 292.200 315.875 342.575 371.625

If you have observed any HQ frequencies, we would like to hear from you. You can contact us at the address in the masthead.

MacDill AFB Frequencies

MT reader JT Ward recently sent us a list of the regular frequencies he monitors at MacDill AFB in Florida. Thanks for the list JT.

MACDILL AFB, FLIGHT OPERATIONS

ATIS	270.100/133.825
Ground	275.800/121.650
Tower	294.700/123.700/126.200
Command Post (Lightning Ops)	311.000/321.000/132.775
Dispatcher	372.200
Weather	344.600
Drop Zone	240.100

TAMPA APPROACH/DEPARTURE

239.300 269.100 279.600 290.300 319.800
354.000 362.300 363.800 119.650 119.900
125.300 132.525

MACDILL AFB, GROUND OPERATIONS

149.1750	Maintenance
149.3250	Communications Squadron
163.4625	Security (simplex)
163.4875	Security (Primary, simplex)
163.5125	Unidentified
163.5375	Flightline - Ch. 2 (B) (Maint)
163.5625	Flightline - Ch. 1 (A) (Maint Primary)
163.5875	Flightline - Ch. 3 (C) (Maint)
165.0125	Civil Engineers
165.0150	Electricians
165.1125	Command Net
165.1625	Haz-Mat
165.1875	Fuel Trucks
169.6000	Hospital Paging
173.4375	Explosives
173.5625	Medical
173.5875	Fire/Crash/Rescue (Crossband repeater)
408.7500	Fire/Crash/Rescue (Crossband repeater)
418.3500	Medical

Military Trunking Systems

With the release of the Uniden BC-245XLT, military monitoring enthusiasts can now listen to most of the various trunking schemes being used by the Department of Defense in the 138-150 and 406-420 MHz frequency ranges (except digital voice systems).

However, there hasn't been a whole lot of information available on frequencies and talk groups using these various systems. Starting with this month's *Milcom* column, we will explore these previously uncharted waters and where holes exist, hope that some of our readers can fill in the blanks.

To start our survey of these systems, this month we will concentrate on the known military Ericsson EDACS trunking systems. As always we welcome and encourage your additions, updates, and corrections either via email or at Milcom, P.O. Box 98, Brasstown, NC 28902.

Elmendorf AFB, AK (10 Frequencies)
407.950 408.350 408.750 408.950 409.150 409.550 409.750 410.200
Sources have indicated that the U.S. Army is the actual owner of this system.

Fort Greely, AK – No frequency/talk group information available on this system.

Fort Richardson, AK (5 Frequencies)
406.350 407.150 407.550 408.750 409.550
Users: Fire Department, 1117th Signal Group, Military Police, Range Control, and DOL

Fort Wainwright, AK (10 Frequencies)
406.350 407.150 407.950 408.350 408.750 408.950 409.150 409.550 409.750 410.200
Users: Command Operation Center, Fire Department, Range Control, and Military Police.

Fort Irwin/National Training Center, CA (21 Frequencies)
406.550 406.650 406.775 406.850 406.950 407.075 407.425 407.550 407.625 407.950 407.975 408.025 408.150 408.350 408.550 409.075 409.150 409.450 409.550 409.750 409.950

Fort Benning, GA (8 Frequencies)
415.350 415.550 416.150 416.350 416.950 417.150 417.750 418.550

Camp Frank D. Merrill, GA (U.S. Army Ranger Mountain Training Division–Dahlonega)
407.250 (LCN1) 407.375 (LCN2) 407.525 (LCN3) 407.575 (LCN4) 408.050 (LCN5)
Talkgroups: 00-006 (Unknown)
15-141 (TMC)

Fort Polk/JRTC, LA (39 Frequencies)
Site 1: 406.350 406.750 407.150 407.375 407.475 407.950 408.150 408.475 408.575 408.750 408.950 409.150 409.325 409.550 409.750 409.950
Site 2: 406.350 406.550 406.750 407.150 407.350 407.450 407.950 408.050 408.150 408.550 408.750 408.950 409.150 409.300 409.550 409.725 409.950
Site 3: 407.175 407.325 407.425 407.525 408.025 408.175 408.425 408.525 408.625 409.025 409.125 409.225 409.350 409.475 409.600 409.850 410.000

Hanscom AFB, MA – No frequency/talk group information available on this system.

NAS Meridian, MS – No frequency/talk group information available on this system.

Fort Monmouth, NJ – No frequency/talk group information available on this system.

Naval Station Roosevelt Roads, PR – No frequency/talk group information available on this system.

Charleston, SC – No frequency/talk group information available on this system.

Fort Lewis, WA
406.950 407.250 408.550 409.150 409.350 410.150

The following U.S. Navy ships are reported to have EDACS trunking systems onboard: *USS Constellation, USS Eisenhower, USS Enterprise, USS Harry S. Truman, USS Ponce, USS Rushmore, USS Stennis,* and *USS Yorktown*. No information was available on these systems at press time.

That will do it for this issue of Milcom. Until next time, good hunting.

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Jean Baker, KIN9DD

Florida Frequencies

Welcome aboard! First off, we have some Florida frequencies for our readers in that area and we're landing at Fort Lauderdale Airport for our first stop. These frequencies and Jacksonville's were donated by Nick Gossman, who tells us that the vast majority of Fort Lauderdale approach/ departure communications are handled by Miami International Air Traffic Control.

Fort Lauderdale:
Tower - 119.300
Ground - 121.400
Ground (2nd) - 121.700
ATIS - 135.000
Approach & Tower (2nd) - 120.200
Clearance Delivery - 128.400
ATIS - 135.000
Miami Approach:
Fort Lauderdale Area - 118.100
Fort Lauderdale Area - 128.600
Fort Lauderdale Area - 133.775
Miami Departure:
Fort Lauderdale Area - 119.000
Fort Lauderdale Area - 126.050

Jacksonville International Airport:
Tower - 118.300
Ground - 121.900
ATIS - 125.850
Approach/Departure - 118.000
Approach -
118.600, 119.000, 120.750, 121.300, 123.800, 124.400, 124.900, 127.000
Gainsville Area - 118.175
Tallahassee Area - 133.850
Tyndall Airspace - 119.750

Keeping Company in Chicago

Here's a wealth of O'Hare International Airport airline company frequencies, courtesy of K. O'Rourke and Scott Miller:

Air Canada - 130.475
ACARS - 129.125, 130.025, 131.550
American Airlines -
128.975, 129.225, 129.875, 130.250, 130.650, 130.750, 131.875
129.325 (H Gates "Hotel" Maint.
129.675 (Gate/ramp ops)
American Eagle - 128.850, 131.600, 131.625, 131.825
American Trans Air - 131.525
America West - 131.500
ARINC - 129.350, 129.450
Canadian Airlines - 130.075
Continental (& America West?) - 129.925
Delta - 129.600, 131.225
Foreign Airline Ops - 129.725
International Terminal Ramp Control - 129.050
Japan Airlines - 128.825
Mexicana - 130.325
Northwest - 131.900
Reno Air - 129.600 (Delta provides services)
Signature Air Flight Svcs - 128.925
130.375 (Ramp ops)
Tower Air - 129.825
TWA - 130.725
United - 128.950 (Maintenance)
129.075 (Gate/ramp ops)
129.300 (Maintenance)
130.150
131.300
United Express - 129.375 (Atlantic Southeast)
130.200 (Air Wisconsin)
130.400 (Air Wisconsin)
131.350 (Lakes Air)
131.775
131.950
USAirways - 129.800

Washington Air Traffic Control

Now for some Washington, DC, Air Route Traffic Control frequencies. Some of these are paired VHF/UHF, and others are simply VHF. These frequencies were donated by a friend of mine who is a controller.

118.000, 118.025/397.950, 118.750/377.100, 118.825/360.650, 118.925/322.450, 120.375/327.000, 120.650/319.100, 120.850, 121.025/254.300, 121.500, 121.675/284.700, 123.850/323.000, 124.025/290.500, 124.050/307.000, 124.725/350.350, 124.775/362.300, 125.450/363.000, 127.425/387.050, 127.700/285.400, 127.750/380.300, 127.925/317.700, 128.525/257.700, 128.600/387.100, 132.025/269.400, 132.050/277.400, 132.225/354.100, 132.275/269.650, 132.525/287.900, 132.550/256.800, 132.775/351.800, 133.025/319.000, 133.125/278.500, 133.200/282.200, 133.275/371.900, 133.575/270.350, 133.650/285.600, 133.725/351.900 133.825/327.800, 133.850/288.050, 133.900/281.400, 133.975/381.500, 134.025/269.300, 134.150/385.400, 134.400/353.900, 134.500/360.700, 134.625/377.200, 135.200/348.650, 135.300/285.500, 135.400/263.100, 135.500/272.750, 135.525/357.600, 243.000.

Murphy's Law for Frequent Flyers

These were written by Carl Macina and attributed to him and a co-flyer, Ron Miller; from Chris Greenbank's "The Aviation Humour Collection." Visit this website at: **http://members.aol.com/cgreenbank/aviation/avihum.htm**

1. No flight ever leaves on time unless you are running late and need the delay to make the flight.
2. If you are running late for a flight, it will depart from the farthest gate within the terminal.
3. If you arrive early for a flight, it inevitably will be delayed.
4. Flights never leave from Gate #1 at any terminal in the world.
5. If you must work on your flight, you will experience turbulence as soon as you touch pen to paper.
6. If you are assigned a middle seat, you can determine who has the seats on the aisle and the window while you are still in the boarding area. Just look for the two largest passengers.
7. Only passengers seated in window seats ever have to get up to go to the lavatory.
8. The crying baby on your flight is always seated next to you.
9. The best-looking man/woman on your flight is never seated next to you.
10. The less carry-on luggage space available on an aircraft, the more carry-on luggage passengers will bring aboard.

More contributions to aviation humor from Bob Bell, our Australian Correspondent who writes the *Australian Aviation* column, "On the Airbands":

ATC: "USAirways 353, contact Cleveland Center on 135.6"

USAirways 535: (Silent)

ATC: "USAirways 353, I say again, contact Cleveland Center, 135.6!"

USAirways 535: (Silent)

ATC: "USAirways 353, you're just like my wife...you never listen!"

USAirways 553: Center, this is USAirways 5-5-3, maybe if you called your wife by her right name, you'd get a better response!"

Bob tells us the next story was contributed by Robert Duvall, who lives in the United Kingdom. The story involves Southend Tower and "National 676," a BE90 airliner:

Southend TWR: "National 676, cleared for takeoff, report passing two thousand"

NAA 676: "Clear for takeoff, call you passing two thousand"
and then.....

NA 676: "National 676, passing two thousand, climbing"

Southend TWR: "National 676, call London on 128.6"

NA 676: "To London Control on 128.6, see you on the way home!"

(In the process of changing radio frequency, National 676 loses a door...YES... a door, and makes the following emergency transmission):

NA 676: "Mayday, Mayday, Mayday, London Control, National 676, four miles west of Southend, two thousand five hundred, I've lost a DOOR and am returning, climbing to four thousand, and returning to Southend Airport"

London Control: "Are you in control of the aircraft, Sir?"

NAA 676: "No more than usual!"

That's all for today. See you next month with more aero comms news, frequencies, views, and funnies. Until then, 73 and out.

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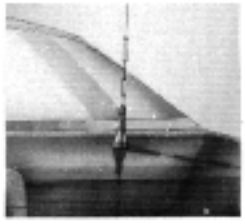
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Doug Smith, W9WI
w9wi@bellsouth.net

Y2k and Broadcasting

The year, the decade, and the century are just about over. What will the famed computer bug mean for the domestic-band DXer? I'm not an alarmist; I don't believe all you-know-what will break loose at midnight on the 31st. I do think there's a good chance *something* out of the ordinary will happen, *somewhere*.

Much of the concern about the bug is over the possibility of massive electrical power failures. Personally, I will be very surprised if there are more than a handful of scattered problems with the electricity. If I'm proven wrong, most larger stations have emergency backup generators. (After all, bad weather – and drunken drivers running into power poles – happen whether Y2k is with us or not.) Your local news-talk outlet, the larger FM music stations, and the network-affiliated TV stations will not be much affected. Smaller stations could be affected, though.

While the electrical utilities have paid considerable attention to century rollover issues, many smaller broadcasters probably haven't. That said, there aren't many items in the typical broadcast station that depend on knowing the correct year. Routine maintenance is scheduled manually (if at all). Nobody's transmitter is going to pop off the air because it thinks it hasn't been cleaned in 100 years.

It is possible some program-automation equipment will make invalid day-of-week calculations and lead to some interesting messups – dead air, public-affairs programming popping up in the afternoon drive-home time slot, etc.. Probably the most trouble-prone part of the typical station is the traffic system, the system that handles scheduling of and billing for commercials. But this won't affect the station's on-air sound.

What about your receiver? A majority of receivers don't even have a clock in them; these sets cannot be affected by the rollover. Many of the receivers that do have a clock don't have any provisions for setting the year; these will not be affected either. Even if your receiver does have a calendar, the worst probable consequence of Y2k will be the set failing to turn itself on or off on schedule. Manual operation should be unaffected.

There may be reasons other than computer failure for unusual goings-on. Radio stations are not completely exempt from "excessive celebration." And pirate broadcasters have always been fond of holidays, especially New Year's Eve. This year should be especially popular with the unlicensed set. Keep an ear on locally-open spots in the expanded band, especially 1610 and 1710 kHz.



The USA isn't the only country you might hear in the 1610-1700 kHz expanded AM band.

Bits and Pieces

• Benjamin Dawson of Seattle forwarded a copy of Annex 4 of the U.S.-Mexican agreement on the use of the 1605-1705 kHz band. The Mexican allocations are in the sidebar. This agreement also provides for 20 U.S. expanded-band stations that are *not* in the FCC allocation table. Presumably these stations could be added later without further negotiations with Mexico.

Benjamin also corrected me on my comment about Mexico being the fourth country to use the expanded band. According to the ITU conventions, the expanded AM band is only allocated in Region II, the Americas. AM broadcasting stations have operated in this band in Australia for over 25 years, but the Australian stations are technically classified as experimental or non-commercial. European readers should not expect to hear local broadcasts in this band.

• Speaking of Europe, Mike Muehlbauer N6TWX wrote from Germany. He wanted to know if there's an easy way to estimate the daytime coverage area of an AM station? Unfortunately, there are so many variables that it's really quite difficult to make such an estimate. Power, antenna efficiency, and directional pattern are obvious factors.

It is somewhat less-known that stations at the bottom of the dial have better daytime coverage than those near the top. Finally, the conductivity of the earth has a major effect on coverage. Over-water paths are best; the rich farmland of the Dakotas, Iowa, and Nebraska is also very good for daytime DX.

Mike has had very good luck in nulling bothersome "pest" stations with his YB400. S3 stations can be faded into the noise by simply rotating the radio. This makes it possible to hear the U.K. or eastern Europe through heavy interference. Spain is the source of many of these "pests." Mike writes, "Not that they are bad, just that they completely dominate the band at night with mainly only three different programs."

Actually, that sounds a lot like the AM dial here in the States<grin>!

I know: you aren't supposed to be DXing AM during the day. But at this time of year, there's plenty of interesting DX to be had at all times of day. What are you hearing? Write me at Box 98, Brasstown NC 28902-0098, or by email to *w9wi@bellsouth.net*. Good DX!

MEXICAN EXPANDED-BAND ALLOCATIONS

The U.S.-Mexican agreement for use of the expanded AM band authorizes Mexican use of the following frequencies:

City	Frequency
Nogales, Sonora	1610
Ojinaga, Chihuahua	1610
Ciudad Juarez, Chihuahua	1620
Anahuac, Nuevo Leon	1620
San Luis Rio Colorado, Sonora	1620
Tijuana, Baja California Norte	1630*
Ciudad Acuna, Coahuila	1630
Matamoros, Tamaulipas	1630
Guerrero, Coahuila	1650
Puerto Penasco, Sonora	1650
Agua Prieta, Sonora	1660
Janos, Chihuahua	1670
Reynosa, Tamaulipas	1670
Caborca, Sonora	1680
Piedras Negras, Coahuila	1680
Nuevo Laredo, Tamaulipas	1690
Benavides, Chihuahua	1690
Mexicali, Baja California Norte	1690
Guerrero, Chihuahua	1700
Ocampo, Coahuila	1700
Tecate, Baja California Norte	1700

** XEUT-1630 is already on the air here.*

George Zeller
George.Zeller@acclink.com

South American Pirates

Due to illness, this will be a shorter column than usual. As always during Halloween and the Thanksgiving holiday, remember to keep your ears open for increased pirate activity, and let us know what you hear.

DJ Stevie from Switzerland sent us an update from the following South American and other pirates.

Radio Cochiguaz from South America has been active on 21860 kHz and 6980 or 6950 lower sideband. Andino Relay Service has been occupying 6880 kHz LSB, offering new special QSLs via *swrs@usa.net* for lucky listeners like Ranier Brandt in Europe who hear their Short Wave Relay Service (SWRS).

Radio Alfa Lima, from Holland on 11480 kHz, is affiliated with the World Association of Community Radio Broadcasters (WACRB). Try Postfach 220342 - 32474 Wuppertal, Germany, the standard Wuppertal adress to reach WACRB. They really want to hear from you about your listening habits, as does Galaxy International from Holland on 6306 kHz. An unidentified operation was heard on 13910 kHz, along with SWRS on 3905, 6260, 7465, 11470, and 21860 kHz.

Berkeley Liberation Radio is Back

In response to the demise of Radio Free Berkeley, Bay Area free radio enthusiasts have announced the startup of Berkeley Liberation Radio on 104.1 MHz from a 38 watt homebrew transmitter. The official schedule is 0800 to 2400 local time, with programming touted as "highly diverse grass roots radio." Their web site at **http://www.berkeleyonline.net/blr** is the place to check out for the latest details.

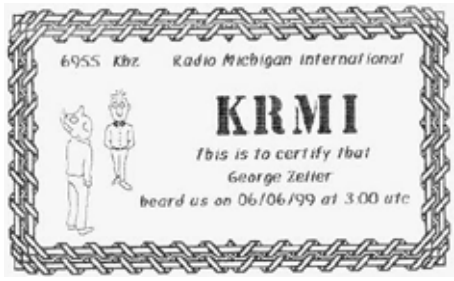
Wierd Clandestine Stuff

Try 5562 kHz for the harmonic of Radio Bir in Turkey. Sudanese clandestines galore are active on 8000 kHz; check it out, with thanks to Harald Kuhl's tips, and to Martin Schoech's Clandestine Radio Watch, which is just tremendous.

What's on the Air

Our readers heard these shortwave pirate stations last month. Despite continued broadcasting from the licensed Peruvian Radiodifusora Paraton on 6955.5 kHz, frequencies within 500 kHz of 6955 kHz still support North American pirate activity, normally from two or three hours before sunset until at least 0500 UTC, but more stations are sneaking to 6950 kHz. Morning and afternoon broadcasts increase on the weekends; with most evening activity on weekends as well. We list programming formats and contact maildrops here:

Ask Julie- And ask Dr. Tornado at Radio Metallica Worldwide about their mailbag. (unknown)
Andino Relay Service- They relay both North American and European pirates on 6935.2 kHz lower sideband, from a South American location. (Santiago)
Blind Faith Radio- Rock and James Brown parodies. (Merlin)
Farmers from Holland- Rumors have it that the drunken Netherlands pirates were busted. Say it ain't so!
Highlands Classic Rock- Their fare is from Ireland, not American classics.
Jerry Rigged Radio- Bags and caps as veries from this one. (Providence)
KIMP- Need Georgia traffic reports? Tune in here! (Lula)
KMART- Stone Cold and the Beach Boys. (stonecold6955@hotmail.com)
KRMI- Our friends at KRMI in Michigan, who we see here this month, solicit your views via the *Free Radio Weekly* newsletter; try yukon@mdn.net but there are no guarantees.



Lounge Lizard Radio- Dean Martin Volare Stuff Here. (who knows?)
MIDI Radio- This is all we know: (midiradio@yahoo.com)
Radio Azteca's- Host complains regularly that he hasn't heard from *MT*'s host; hi Bram! (Belfast)
Radio Bingo- Don't ask Niel Wolfish or John Arthur for your winnings, despite announcements here.
Radio Eclipse- Steve Mann figures that if WMPR can have a dance party on 6950 kHz, so can he.
Radio Fusion Radio- A parody of themselves, with over 123 QSLs served! Congrats Bill!
Radio Mariquita- Thank Enrique if you liked their QSL last month. (Wernbagher)
Radio Smooth- We need help from Captain Ron; how do we write you?
Radio Three- Sal Amoniac wants logs sent to *The ACE*, so let's send them!
Radio Tornado- Still parodying Radio Metallica Worldwide regularly, with 31 QSLs in circulation.
Rock-It Radio- Bennie Dingo uses (**http://www.rockitradio.net**). Check out his links page.
WDRR- J. G. Tiger is the host for rock oldies on this one, using (wdrr@juno).
WHYP- James Brownyard's news and CBC weather remains hyperactive, you can't miss it!
WKND- Radio Animal is still with us, (Blue Ridge Summit).
WMPR- This dance music station with a killer signal sometimes substitutes Grateful Dead stuff. (unknown)
WRYT- Check them out on Dave Zantow's web site (**http://www.ticon.net~davez**) and elsewhere.
WWRX- Jimmy the Weasel, either live or in this parody, strangely fascinates DXers. (Manomet)
WWV- Be the first on your block to get their pirate t-shirt via the 900 phone number.

Reception reports to pirate stations require three first class stamps for USA maildrops or $2 US to foreign addresses. Send your letters to PO Box 1, Belfast, NY 14711, PO Box 28413, Providence, RI 02908; PO Box 109, Blue Ridge Summit, PA 17214; PO Box 1464, Manomet, MA 02345; PO Box 293, Merlin, Ontario N0P 1W0; and Postfach 220342, 42373 Wuppertal, Germany. For information on *The ACE*, send an SASE to PO Box 15830, Chesapeake, VA 23328.

Thanks!

Your input is always welcome via PO Box 98, Brasstown, NC 28902, or via the e-mail addresses atop the column. We appreciate material sent in this month by **John T. Arthur, Belfast, NY; Shawn Axelrod, Winnipeg, Manitoba; Ranier Brandt, Hoefer, Germany; Ross Comeau, Andover, MA; ACE Editor Joe Filipkowski, Providence, RI, checks in again; Bill Finn, Philadelphia, PA; Harold Frodge, Midland, MI; Patrick Griffith, Federal Heights, CO; William Hassig, Mt. Prospect, IL; Dave Kirby, Willowick, OH; Harald Kuhl, Germany; Greg Majewski, Oakdale, CT; Bill McClintock, Minneapolis, MN; Mike Prindle, New Suffolk, NY; Al Quaglieri, Albany, NY; Martin Schoech, Merseburg, Germany; Enrique Alejandro Wernbagher, Buenos Aires, Argentina; Jeff White, Miami, FL; DJ Stevie, Basel, Switzerland; Niel Wolfish, Toronto, Ontario; Dave Zantow, Janesville, WI.**

Kevin Carey, WB2QMY
lowband@gateway.net

Did You Know…

Not everyone is interested in the nitty-gritty details of beacon reception. For many, it is enough to know the location of a beacon and perhaps the name of the facility that it serves. Still, I find that many *MT* readers are accustomed to digging a bit deeper. For serious "ute" monitors, it is often the details that make the difference between an ordinary intercept and one that is worth recording in the logbook.

This month, let's look at some little-known facts about beacons and discuss how these tidbits of information may affect your listening. Even if you're not a DX hound, the information should provide insight on why beacons operate the way they do.

ID, Please

Did you know that many beacons can transmit additional information besides their ID? For example, to indicate that operation has switched to emergency (battery) power or to a backup transmitter, some stations automatically append an "E" to their ID. Beacon ENS/400 kHz (Ensenada, Mexico) has sometimes been heard in this mode—sporting an ID of "ENS-E."

Most Canadian beacons also have a clever way of indicating their status. Normally, there is a 600 ms space between the end of the ID and the long dash that is common to virtually all Canadian beacons. However, when there is an AC power failure and operation switches to battery power, the ID changes to three cycles of 600 ms spacing and three cycles of 1200 ms spacing.

Should a beacon's main transmitter fail and switch over to a reserve transmitter, the normal 600 ms spacing is extended to 1200 ms on *every* ID cycle, and will continue in this way until the problem is corrected.

Speaking of Canadian Beacons, did you know there are a handful of special IDs reserved for *transportable* beacons? If you're lucky enough to hear UAA, UFF, UGG, UJJ, UNN, USS, UTT, UWW or UZZ you'll know you've tuned one in. Transportable beacons might be used at temporary air fields or for military operations.

Finally, there are two common pitches used in North America; 400 Hz and 1020 Hz. With few exceptions, 400 Hz is used in Canada, and 1020 Hz is used in the United States. Telling them apart is easy, and can be a first indicator of a beacon's location.

It's Your Call

Did you ever wonder why beacons don't have conventional "K" or "W" call signs like other radio stations? As a government agency, the FAA, which operates most beacons, does not come under FCC control. For this reason, you will not find aviation beacons listed in FCC online databases that claim to cover the "whole spectrum."



"V" shaped antennas at many longwave sites are for a separate 75 MHz marker beacon.

What Goes Up…

Many FAA beacons include a "V" shaped antenna that is usually orange in color. This antenna is not part of the longwave equipment, but is for a separate 75 MHz marker beacon housed in the same shelter as the LF equipment. Marker beacons transmit a tightly focused beam straight up to help pilots determine when they are directly over the beacon site.

Splinter Groups?

Here's an interesting tidbit that I am still researching. An anonymous source has indicated that not all FAA beacons operate on whole number frequencies (i.e., 258, 259, 260 kHz). According to the source, some beacons are listed in federal documentation as operating on .51 kHz "splinter" frequencies (i.e., 260.51 kHz). The reason for this offset eludes me except possibly to reduce interference between beacons that are geographically close *and* close in frequency. I would appreciate reports from some of you with highly accurate frequency dials to verify this information.

Multiply Your Catches

Have you ever been traveling and come across what you suspect might be an LF beacon? Here's a trick that may help you find the answer: It is often possible to hear the second or third harmonic of a beacon on your car's AM radio. I used this trick while on vacation to hear EVB/417 kHz at New Smyrna Beach, Florida, near 834 kHz (417 x 2 = 834). Of course, you must be quite close to the station (1/8 mile or so) for this to work.

Natural Radio Update

In response to reader requests, I am researching a simple, but effective natural radio receiver project for presentation in this column. The goals for the homebrew receiver are:

- 9 Vdc portable operation
- Easy, point-to-point wiring
- Easily obtained parts (Radio Shack, mail order, etc.)
- Low cost, decent performance

If you have additional thoughts on what features the receiver should include, or if you have a favorite circuit you'd like to share, please drop me a line or e-mail me with your suggestions.

End Notes

As I was wrapping up this column, late word arrived that the Isle of Man longwave broadcast station is in full operation on 279 kHz. At 500,000 watts, this station in the British Isles will make an excellent DX target for listeners in the northeast U.S. and Canada. You'll find more information on the station at **www.longwaveradio.com**.

As the winter DXing season gets into high gear, I want to encourage you to set some time aside to log special family times. Have a happy Thanksgiving and I'll see you next month!

The long-awaited UNIDEN BC245XLT is HERE!

This hand-held communications marvel has stunned the scanner marketplace with its dual trunking capabilities! Imagine scanning through conventional channels as well as both Motorola and GE-Ericsson EDACS channels simultaneously, stopping to hear any communications—your choice—on any of these systems!

With land, sea, and air frequency coverage of 29-54, 108-174, 406-512, and 806-956 MHz (less cellular), and 300 memory channels in 10 banks, this potent Bearcat even offers a nine-pin cable connector to permit downloading of computer databases. The information-packed LCD display is backlit for easy night viewing.

Factory pre-programmed search ranges target active police, fire/emergency, air, marine, railroad, and weather channels. Standard features include:

- Individual channel lockout
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Rich Arland, K7SZ
k7sz@epix.net

Bringing Hidden Treasures to Life

One thing I have noticed through the years I've been involved with hobby radio is that "treasures" can be found in the most unlikely places. "One man's junk is another man's treasure" certainly applies in this hobby.

Let me take you back about 11 years. At that time my family was living in Dallas, Pennsylvania. We had just closed on a house in Wilkes-Barre, PA, and were in the process of moving. For the previous 20 years I had relied upon the US Air Force to move me and my family. This time, we did the moving. Talk about a reality check!

Bit by bit we loaded up a rental truck and made several trips to the new house, lugging, tugging, grunting and groaning as we moved all our furniture, appliances and belongings from the old house to the new one. Finally, we had removed all our "stuff" from the house in Dallas and my wife, Patricia and I were making a final sweep around the premises to ensure we had not forgotten anything. Tricia called me to the attic/bedroom and pointed down toward the edge of the roof. Wedged between the floor joists was a small black leatherette case with a plastic handle on top.

"What's that?" asked my wife.

"I dunno. Looks kinda like a portable radio," I replied.

"Well, you better check it out and grab it if you want to keep it, otherwise it's staying here," she replied.

I picked up the black box, flipped up the front lid to reveal a portable Zenith AM/SW radio, circa mid to late 1940s. What the heck, I'll drag it along. Maybe I can restore it. Little did I realize what I actually held in my hands.

Flashing forward a few years: Dr. Harold "Dr. DX" Cones, and John Bryant had published their extremely successful book, *The Zenith Transoceanic, the Royalty of Radios.* I had been talking to Harold at one of the SWL Winterfests shortly after publication of his book. Naturally, I obtained a copy and was reading it with interest. I had always longed for a Zenith TO. While stationed in the Azores in the early 1970s, I had access to a transistorized Royal D7000Y Transoceanic and put it to good use for a couple of years. I always vowed that I would have one of these, someday.

After reading the TO book I contacted Harold about the Zenith AM/SW receiver I had sitting in my basement. He urged me to open up the set and find the model and chassis number and compare them to the listings in his book. That should remove any mystery about what I'd discovered in the floorboards of our old house.

Several weeks later I was rummaging around in the basement and spied the old Zenith set. I pulled it out and took it upstairs where I started to dissect it. Dutifully I copied down the chassis numbers: 6G004 Global-6C41. Then I retrieved Harold's book and started searching the mass of information contained within the covers.

Boy, was I in for a surprise! On page 68, I found out *exactly* what I'd rescued from our old house in Dallas. The Global was considered a "companion receiver" to the 1946 Zenith Transoceanic receiver, model 8G005Y. Actually, the Universal (AM only) was the companion receiver, and the Global was an AM BCST/SW (9.4 to 12.1 MHz) variant that was produced in extremely limited quantities from January through March of 1946!



The rare Zenith Global receiver circa 1946. Note the SW dial markings above the AM broadcast band. The red switch cover over the band switch on the right is the only thing missing. K7SZ photo.

The Zenith book revealed this was a "very rare" set of questionable origin. The Zenith factory did not have any pictures of this set, nor were Commander McDonald's personal notes (which Cones and Bryand had unlimited access to while researching the book) of any help in revealing why the Global was produced and how many were ever made. Best guess was that the Global was a limited production receiver done by Zenith for a promotional event for some long forgotten company.

I checked back with Harold on the phone. He was truly amazed at my find and provided me additional indepth information on restoration techniques.

Restoration Begins

Naturally, this set failed to work. It was easy to see why. It was missing two vacuum tubes! It used loktal tubes which I located at Antique Electronic Supply. A close look under the chassis showed much of the rubberized wiring was in poor shape and would require replacement. Restoration of this Global would require a *lot* of work.

As long as much of the wiring had to be replaced, I figured that all the old caps should be replaced as well. An order for Sprague "Orange Drop" caps went in to Antique Electronic Supply. When the caps arrived it was time to get to work.

This type of restoration is tedious, at best. Each wire had to be traced, color coded and replaced with new wiring. Each cap was unwrapped from its original termination and a new Orange Drop cap of the proper value was substituted. When replacing the caps, I always like to include a covering of each lead with some insulating material (called "spaghetti") to insure that short circuits are kept to a minimum. All the tubes were checked (even the new ones) and, after a couple of months of part time restoration efforts, it was time to "smoke test" the Global.

I *always* get nervous when it comes to initially plugging a restored "boatanchor" radio in for live tests. You never can tell just what might happen. Hopefully, after tracing and retracing all the new wiring at least four times, you *think* you have all the kinks ironed out, but there is always that nagging doubt in the back of your mind.

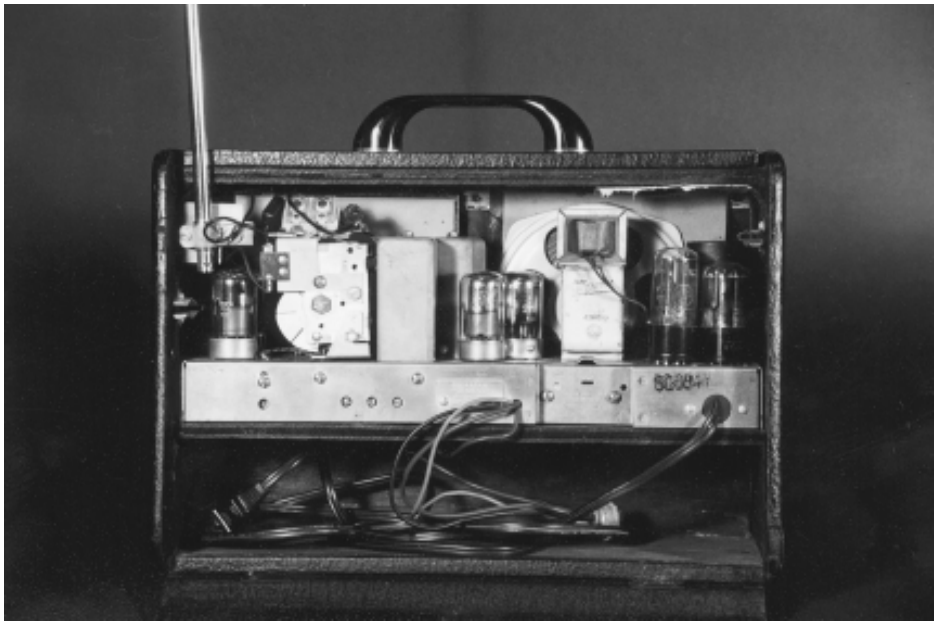
This time was no different. Matter of fact, it was a little more tense, since I was restoring a rare piece of radio history. The plug went

into the Variac, and I started turning up the AC line voltage while my eyes were riveted on the AC ammeter. Any sudden increase of current could indicate a short circuit that might possibly destroy some irreplaceable part of this antique receiver. Yes, a pucker factor was in place!

Slooooooowly I turned up the Variac. Fifty volts, no problem, almost no current. Seventy five volts, the ammeter is starting to move. Ninety volts, we are getting some definite ammeter movement! One hundred volts, sizable increase in current, although still under 200mA. One hundred twenty volts, and the ammeter isn't wavering – a nice steady 300 ma. Looking things over, no smoke, nothing smells hot, and none of the resistors are starting to bubble – things are looking fine!

Turning up the volume brings some noise out of the speaker. Tuning across the AM broadcast band yields a couple local stations. Switching to the SW band and there is some noise but not much else. Looks like an alignment is in order. Luckily Harold had furnished me with a set of schematics for this radio. It was a simple matter of following the alignment instructions and I had a lot of AM BC action and the SW band also came alive.

The cosmetic restoration was a snap compared to the electrical restoration. A couple of thorough washings of the leatherette with Murphy's Oil Soap cleaned the case nicely. Worn areas were treated to some black shoe dye. This brought the case to an overall uniform black appearance. Five applications of black shoe polish (wax in a can type) with a buffing between coats, left the case looking almost new.



Believe me, the interior didn't start out that clean! A new AC cord and all new below chassis wiring brough the old receiver to life. K7SZ photo.

The plastic front panel was cleaned with Murphy's and then thoroughly rinsed in clean water to remove all residue. The only thing that is lacking on this beautiful example of post-W.W.II consumer electronics is a red switch cap on the AM/SW switch. Otherwise this is a completely restored Zenith Global.

Keep it Simple, and Farewell

The point of this column has been to show that you can find all sorts of unique things in the most unlikely places. In this case, I was able to salvage a rare piece of Zenith history that is still wrapped in an enigma as to why it was produced. My thanks to Dr. Harold Cones for the help he offered in my restoration efforts.

This will be my last **K.I.S. Radio** column. I decided some time ago that I would close out this column at the end of 1999. I'd like to thank the folks at *MT* for allowing me to write for their magazine. I'd like to say thanks to you, my readers, for the positive feedback I have received over the last three years. I have enjoyed doing this column, but I feel that I need to move along to other writing pursuits. God Bless and 73, Rich K7SZ

Programming Spotlight, continued from page 65

Frequencies: 0315 on 5960, 13630; *0815 on 9530, 9835, 11710;* 1615 on 15355, 17825.

Lots of Others

The **Voice of Greece** *(0000-0350 on 7450, 9420, 11645, 12105)* and the **Voice of Turkey** *(2200-0800 on 7300, 9445, 9460, 15105)* in their native language services devote a majority of their daily schedules to their national music and pump strong signals into North America.

Afrique Numero Un, Gabon (west Africa), even though targeted to Africa, often puts a strong signal into North America. The melodic and varied tunes of the continent are a staple of the station's broadcast day, which runs from 0500 to 2300 on 4890, 9580, 15475, 17630.

Tropical band stations (generally, below 5100 kHz.) are primarily domestic channels that can be heard quite well over several thousand miles after dark, especially during the winter season when static levels subside. **Ecos del Torbes** in Venezuela (4960), **Caracol Colombia** (5076) and **Radio Quito** in Ecuador (4819) are examples of such stations that play a great deal of Latin American popular music.

Stations in the Middle East play a variety of Arabic secular and Islamic music. **All India Radio**, usually quite audible during North America afternoons on 11620, includes a full range of subcontinental music in its schedule.

As we've said all along, there is no way we can list every music program on the shortwave dial. Hopefully, at least we've given you some new ideas and things to try. Spin that dial and, if you're hearing something regularly that you think others would enjoy, drop me a line or e-mail with the details and I'll share your discovery with the rest of the world.

Until December, good listening!

Bill Cheek
email: bcheek@comtronics.net

Electroluminescent Panels

Illumination is a vital part of a radio. Even though radio is all about listening, you still need to see and operate the input/output interface. Panel lamps and illumination schemes became an art form in the early days of radio. The art took on a new dimension as light-emitting diodes (LED) for data readout gave way to liquid crystal displays (LCD).

LCD data is difficult to see without adequate backlighting, since the module is usually clear glass. Data is present when internal segments of the LCD switch from clear to opaque. If the background is dark or poorly illuminated, the data can't be seen.

Types of LCD Back Light

At least three LCD backlighting schemes emerged over the years: (1) incandescent - the earliest and still used; (2) electroluminescent, 1984-1995, and (3) LED - most recent (for back lighting; not data).

Incandescent light is a non-issue – it works fine until a bulb burns out. Replace it and you're back in business. Examples of incandescent LCD backlighting include the Uniden BC-760XLT, PRO-2026, and most handheld scanners.

LED light is a non-issue – LEDs don't burn out. By the way, you don't actually see LEDs in back lighting schemes. They are embedded in a translucent fiber optic block called a "diffuser" or "light pipe" that evenly spreads the LED light through the LCD module. Examples of LED back lighting include the PRO-2035 and PRO-2042 scanners.

Electroluminescent (EL) light is a major issue (and the focus of this article) because EL panels are found in some of the best scanners ever made; and they eventually wear out and must be replaced.

EL Back-lit Scanners

Better Realistic scanners between 1984-1995 used EL panels to back light LCD displays. Included were the PRO-2004/2005/2006, PRO-2020/2021/2022; perhaps others. But EL light dims over time. EL panels can be replaced, but drop-in replacements aren't available anymore.

Why? Simple economics! Manufacturers generally support their products with repair parts for five years after discontinuance. The logic is double-edged: (1) failures after five years generally aren't worth costs of repair, and (2) units that are still functional after five years are likely to stay working.

Technology moves fast now: who wants a 1985 computer or TV? Tandy probably never dreamed its PRO-2004/5/6 series would still be competitive today, and therefore couldn't anticipate a demand for replacement EL panels 10 years after a scanner was discontinued. Unique components, (EL panels) are produced under limited duration contracts.

Ironic that modern technology gave many older radios a longer lifespan that anyone ever dreamed. Your old scanner still ranks among the best, but the LCD data isn't visible because the dang EL panel wore out and you can't get a replacement. So whaddya do?

EL Lighting Alternatives

A scanner's original EL panel is a thin plastic-laminated "card" with two electrical tabs or wires, that slides in behind the LCD display module. The EL panel contains chemicals that glow (luminesce) when powered by high AC voltage. When the EL panel needs replacement, unsolder its two tabs or wires; break the white locking glue drop; slide out the panel; and install a new one. (See ahead.)

I've researched alternatives to EL lighting for some time without clear success, but possibilities surfaced. First let's look at the unfeasible or impractical.

It isn't feasible to replace EL panels with incandescent lamps or LEDs placed behind the clear glass LCD modules. Direct light can't be diffused and spread evenly enough to illuminate the LCD area. Figure 1, a view from above, illustrates what I mean.





Feasible, but ugly, is an incandescent bulb or two off to either side of the LCD so that only reflected light passes through the display. Figure 2 conveys the idea. Frankly, it's not worthwhile to retrofit incandescent or LED backlighting into these glorious scanners of the past. It doesn't look good and the illumination is deplorable.

The most likely candidate for a presentable EL panel replacement seems to be – what else? – roll your own! Table 1 presents three suppliers of generic EL panel material, the first of which I found to work equal to or better than the originals, but all should work fine.

TABLE 1
EL MATERIAL SUPPLIERS

Durel Corporation
2225 West Chandler Road
Chandler, AZ 85224
(480) 917-6000
http://www.durel.com

MetroMark, Inc.
11574 Encore Circle
Minnetonka, MN 55343-8862
(800) 680-5556
(612) 912-1700
http://www.metromark.com

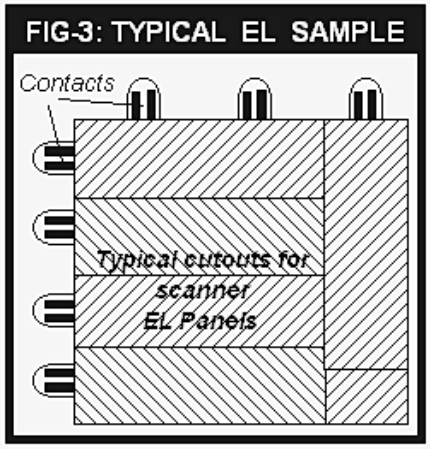
LSI
101 Etna Road
Lebanon, NH
(603) 448-3444
http://www.lumsys.com

Catch-22: EL panel material is expensive and suppliers don't like to deal with consumers. But if you can come off as a pro, they might send you a free sample of generic EL material – enough to illuminate your scanner's LCD for years!

I snagged a sample sheet roughly 6" square, similar to Figure 3. I used a paper trimmer to cut out custom panes for my PRO-2004 and 2006 scanners about 1/2-mm narrower than the original panels. Length isn't critical.

EL material is thin plastic with sandwiched substrates. The two leads are conductive traces on a short tab that extends out from the pane. I think special clamps are normally used to attach wire leads, but I didn't explore that. Instead, I soldered two stranded 22-ga wires (ends pretinned) to the tabs. :(

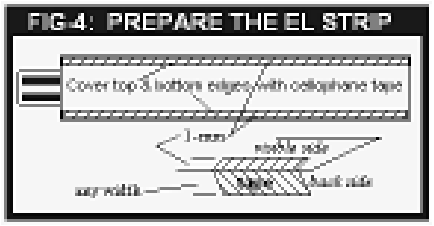
I soon learned that a moment's contact with the soldering pen is almost too long. The plastic tab melts in the blink of an eye so the duration of contact by the soldering pen must



be less than a blink. I sealed the tab in a dab of hot-glue for strength. It doesn't take much, but some support is necessary.

After the edges of sample EL material are trimmed, the internal substrates might be exposed. They carry high AC voltage that could destroy the LCD module if an exposed edge of the EL material touches a pin of the LCD. So I applied cellophane tape over the top and bottom edges of my new EL panel. The extra thickness of the tape along the edges doesn't interfere with sliding down the groove behind the LCD so long as the EL strip is slightly narrower than the original.

Caveat: more than 1-mm of tape on the face of the EL panel will be visible from the front of the scanner. Obviously, tape on the back of the EL panel can't be seen. See Figure 4.



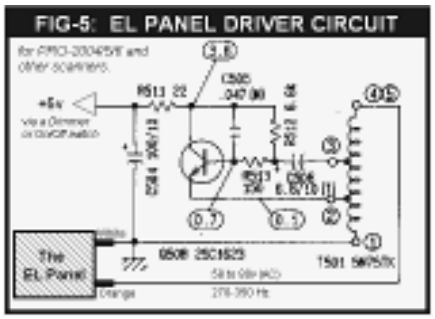
EL Panel Theory and Troubleshooting

EL panels work from internally generated high AC voltage. The DC-AC inverter circuit in most EL-lit scanners is shown in Figure 5. It's a free-running oscillator that feeds a tiny step-up transformer. Circuit symbols differ among the scanners and there might be minor parts-value differences, but if you see one EL driver, you've seen them all. Any EL panel will run from the white and orange leads in Figure 1.

If an EL panel is bright one day and dead the next, the panel didn't fail. It wears out over time, but doesn't fail without warning. First check for a failure of the +5V supply to the EL circuit: no +5V power, no light – simple as that. Refer to Figure 5 where other likely failure modes are:

1. dimmer switch or On/Off switch
2. cold or bad solder joints/connections
3. capacitors
4. transistor

Transformers and resistors rarely fail, so you can reserve those for a last resort.



Going Hi-tech

EL panels are still used throughout industry, except in scanners. This contrasts with cellular phones, pagers, digital watches, pocket PC's, etc, which can last as long as scanners except they become obsolete before their EL panels wear out.

The PRO-2004 introduced in 1986 still isn't obsolete, but imagine using a 1986 computer or cell phone! :) EL panel technology has advanced with the times and can be applied to scanners. The entire circuit of Figure 5 (excluding the EL panel) now comes on inexpensive chips. If your EL driver circuit fails, the above Troubleshooting guide is one recourse, but you can just disable the defective circuit (isolate it from the scanner) and install a modern EL driver chip!

Figure 6 shows a Sipex SP4422 EL driver chip and two external components that drive an EL panel. A high/low control signal is applied to Pin 1 to turn the EL panel on and off. This could be either an SPDT (single pole double throw) switch wired as shown, or a logic "gate" signal.

Requirements and parameters of EL driver chips vary, so Table 2 presents a few chip suppliers for your reference:

Summary and Wrap-up

I haven't finished my research into alternative EL panels for older scanners, but this article might help keep many classics fully operable for many more years. Just snag a sample generic EL panel and maybe a driver chip. Experiment a little. Voilà! :)

Support for this and all my columns is freely available by e-mail. If you're not computerized, please include an SASE with postal requests.

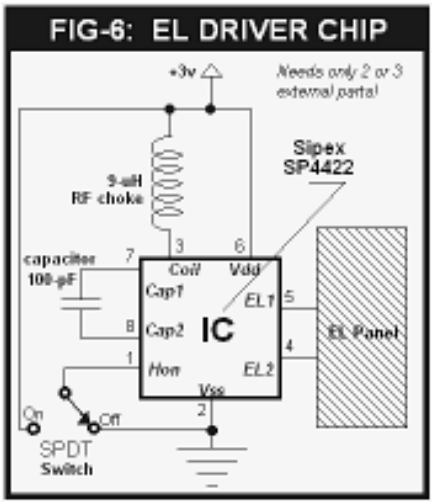


TABLE 2
EL DRIVER CHIP SUPPLIERS

Durel Corporation
2225 W. Chandler Blvd
Chandler, A Z 85224
(480) 917-6000
http://www.durel.com/

IMP, Inc.
2830 N. First St.
San Jose, CA 95134
(408) 744-0100
http://www.impweb.com

Sipex Corp.
22 Linnell Circle
Billerica, MA 01821
(978) 667-8700
http://www.sipex.com

Supertex, Inc.
1235 Bordeaux Dr.
Sunnyvale, CA 94089
(408) 744-0100
http://www.supertex.com

E-mail: bcheek@comtronics.net
WWW: http://www.comtronics.net
FAX: (619) 578-9247
Postal: PO Box 262478; San Diego, CA 92196-2478

Caveat: Modifications may void your product warranty or FCC certification.

Clem Small, KR6A
email: clemsmal@bitterroot.net

The Many Faces of Lightning

There is a certain natural beauty in the wild, raw power unleashed in a lightning strike. How many exciting photographs have you seen showing lightning's lacy fingers etching their jagged patterns across a stormy sky? But lightning has several faces, and beauty is only one of them.

Destruction

The other side of beauty is sometimes destruction, and a single lightning strike may unleash as much as 30,000 amperes at 200,000,000 volts. The resulting 6,000,000,000,000 watts is expended in something like 30 millionths of a second! Couple that with the fact that there are about 100 lightning strikes *per second* world-wide, and you have some really destructive potential to deal with.

Tall trees, electrical-power lines, telephone lines, and tall antennas too often bear testimony to the destructive force of a direct lightning hit. A direct hit can not only disintegrate a radio antenna, it can destroy the antenna lead-in and the room into which the lead-in leads!

A fellow ham, Tom Green, KC7YTL, recently told me the results of a direct lightning strike to a power line near his home. The power line was buried underground, but that didn't protect it from the strike! The current from the lightning bolt flowed into the ground and on down to the cable. On its way to the cable the current made a jagged, melted-glass trace through the rocky, sandy soil. A portion of the cable itself was then disintegrated.

Damage to electronic equipment caused by lightning is not limited to direct strikes on a power line, phone line, or antenna. Lightning striking at a great distance away can sometimes cause serious damage by the current which the strike induces into power lines, phone lines, and antennas remote from the site of the strike. Any experienced radio-electronics repairperson has seen what havoc lightning-induced currents can wreak with radio or computer equipment left connected to the antenna or power line during an electrical storm. Ruined, or even melted components can result from such strikes. Telephone repairpersons also have their stories to tell of the effects of lightning-induced damage.

Interference

Lightning has another ugly face which it often presents to those of us who are involved in radio communications. From the high-frequency band (3-30 MHz) and lower, atmospheric interference continually rears its ugly face. As a general rule, the lower the frequency the worse the interference.

Lightning strikes generate electromagnetic (EM) signals across a broad range of frequencies. The resulting pops and crashes are known properly as "sferics" (short for "atmospherics"), or commonly, but incorrectly, as "static." The background of received-noise which we hear on our high-frequency receivers is due primarily to these sferics, and is testimony to the ability of these signals to propagate world-wide.

Using signals which lightning broadcasts

Copying weak signals through sferic interference is no fun, but there actually is some value to this interference. For instance, these signals often warn of the approach of an electrical storm long before it arrives. And, in fact, there are automatic storm-tracking systems available which receive and electronically measure the direction of arrival, intensity and rate of occurrence of these signals. They then automatically determine the location of the thunderstorms which cause the signals.

The frequencies of some signals generated by a lightning strike are in the audio-frequency range. When these signals propagate around the world, the speed with which they propagate is slightly different for the higher frequencies than the lower frequencies. If we set up a receiving station for these waves in an area free of man-made electrical interference these signals sound very much like whistles or the chirping of birds.

What can we do about interference and damage?

To combat the received-noise problems which lightning and other sources create, we have noise limiters, noise blankers, and even noise-canceling antenna devices for our receivers. Directional antennas are also often a help.

There are also steps which we can take to lessen or perhaps even prevent lightning-induced damage to our electronic equipment. Check the advertisers in *Monitoring Times* for devices such as gas-discharge devices for lightning-induced damage protection, and Polyphaser™ devices. For solid-state equipment protection these approaches are important, but even the old-standard spark gap will help keep damage to a minimum in some situations.

It is a good practice to disconnect and ground outside antennas when they are not in use. Develop the habit of doing this as soon as you finish using your radio; it's too late, and too dangerous, when the storm

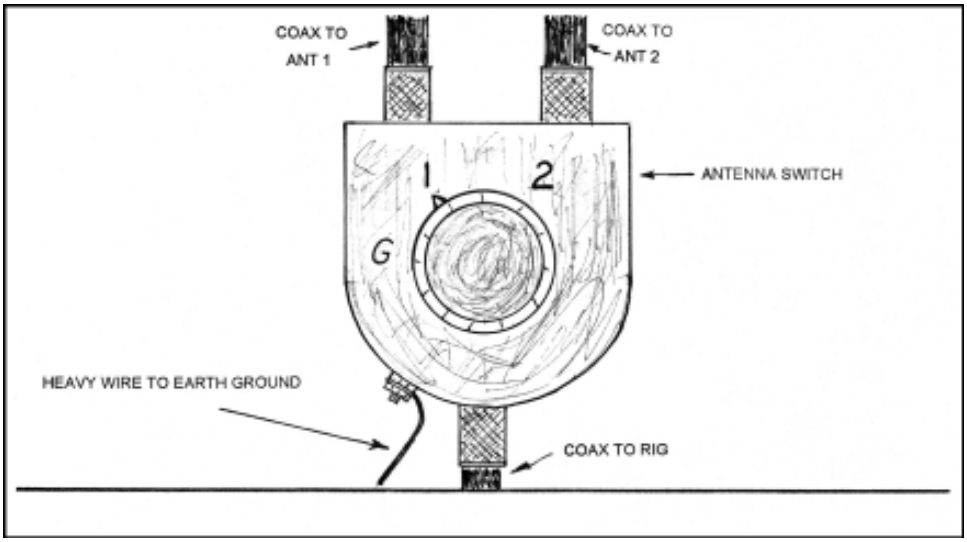


FIG. 1. *Installation using an antenna switch which grounds all unused antennas.*

has already hit! Antenna switches which ground all unused antennas are available from many suppliers (fig. 1). Also it is important when an electrical storm is closing in to never use equipment connected to an outside antenna and to avoid using the telephone.

The antenna tower of a friend of mine, Lee St. Clair, W7AX, recently sustained a direct lightning strike. A neighbor looking in the direction of the tower at the time of the strike told Lee that the tower was bathed in blue flames. The strike actually disintegrated one of three very large ground wires leading from the tower base to the ground.

Miraculously Lee's antennas, lead-ins, radios and telephones sustained no damage! Lee had Polyphaser protection on both his antenna lead-ins, and his telephone lines. In addition, he had followed other good practices such as running his lead-in and rotor-control lines down the inside of the tower, and grounding the tower properly. Relatively few installations can sustain a direct strike as Lee's did and survive!

For more information on lightning protection, and some striking pictures of lightning (pun intended), try the following web sites: **www.polyphaser.com**, **www.arrl.org/tis/info/lightnin.html**, and **www.citelprotection.com/gas.html**. Browse around and you'll find others.

RADIO RIDDLES

Last Month:

I asked "What relationship, if any, exists between our eyes and radio antennas, and between fiber optic lines and coax feedline or waveguide?"

Well, since the times of Maxwell and Hertz we have known that both light waves and radio waves are EM waves. The primary difference between light waves and radio waves is the frequency of the waves.

Because an antenna is a device which can convert radio waves to electrical signals, and the eye converts light waves to electrical signals (the firing of neurons in the retina) we can say that the eye is analogous to an antenna. In the early days, when radio was still called "wireless," this similarity of function between the detection of a wireless wave by the detector of a wireless set and our eyes detecting a light wave, led to calling the detector in a wireless receiver an "electric eye."

The analogy between fiber optic lines, which guide light waves, and feedline or waveguides, which guide radio waves, should now be obvious.

This Month:

Long ago radio engineers developed various means of having audio-frequency (AF) signals, such as voice or music signals, impressed upon radio-frequency (RF) signals. This is accomplished by what is called "modulating" the RF signal with the AF signal. When you listen to a radio program, the program (AF) which you hear reached your receiver as modulation on an RF signal which "carried" the AF through space to your antenna. The AF was then separated (detected) from the RF to produce the AF programming.

Audio-frequency signals such as those flowing in the amplifier, speaker, or earphone circuits of your cassette player or CD player are electromagnetic phenomena. And, in fact, if you were to connect these signals to an appropriate antenna they would be radiated as electromagnetic waves in the same way that radio-frequency (RF) signals are radiated.

Why then do we modulate an RF signal with the AF signals when what we want to transmit is the AF? Why not just transmit the AF directly rather than going to all the trouble of modulating it onto a carrier at the transmitter, and later demodulating it at the receiver to get the AF back?

You'll find an answer for this month's riddle, and much more, in next month's issue of *Monitoring Times*. 'Til then Peace, DX, 73

RECEIVERS

NEW PRODUCT SPOTLIGHT

R75 COMMUNICATIONS RECEIVER!

With the R71 and R72 now long gone, Icom has released their newest communications receiver, the R75! Offering continuous 30 kHz-60 MHz frequency coverage, twin passband tuning, computer compatibility, and all-mode reception (USB/LSB/CW/RTTY/NFM/AM/AM synch), this triple-conversion R75 is hot! Short-wave sensitivity is 0.16 microvolts (SSB), and image/spurious signal rejection is better than 70 dB! Store active frequencies in up to 99 memory channels, and activate the receiver with its clock/timer.

Selectivity is 2.1 kHz (SSB/CW) and 6 kHz (AM), and two optional filters are available. Audio output is a beefy 3 watts, and the receiver is powered either from a 12 VDC system or its AC adaptor (included). A noise blanker, two-level preamplifier, and alphanumeric display are additional perks with this new-generation receiver. An optional DSP unit provides custom sound processing.

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ACCESSORIES

ACC 8	UT-102 Voice Synthesizer	$57.95
ACC 16	UT-106 DSP Unit	$139.95
ACC 74	CT-17 Level Converter	$139.95
BRK 23	MB-5 Mobile Mounting Bracket	$49.95

ORDER RCV 32 Only $789.95 plus $18 UPS shipping or US Priority Mail

GROVE

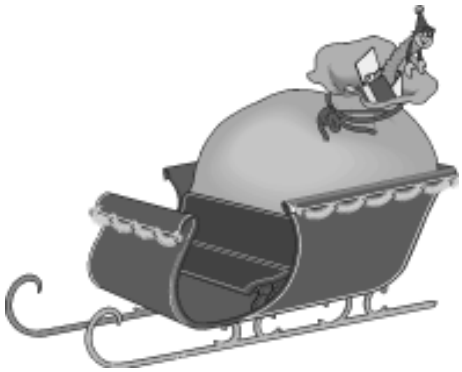
800-438-8155 (US and Canada); 828-837-9200; 828-837-2216 (Fax)
7540 Hwy 64W; Brasstown, NC 28902
web: www.grove-ent.com; e-mail: order@grove-ent.com

ON THE HAM BANDS ...

THE FUNDAMENTALS OF AMATEUR RADIO

Ike Kerschner, N3IK
email: n3ik@hotbot.com

Ike's Santa List



Every November I attempt to provide a wish list for Santa. The best way to use this list is to circle what you like and let this issue of *MT* lay around the house, so all of Santa's helpers can easily identify those things that should be included on the sled Christmas eve. We'll dispense with pictures in the interest of covering more products!

Ten-Tec Omni-VI

Seldom do I include a product such as the Ten-Tec model 564 Omni-VI HF transceiver in this list. But I had an opportunity to use an Omni-VI and can tell you I have never enjoyed using a rig more. Signals seem to pop right out at you. A rag chew with the Omni is a real rag chew, solid signals both receive and transmit. Signals seem to fall right into the speaker, no pops, crashes or squeals.

I compared the Omni to my regular rig (name withheld on request): there was no comparison! Signals that just were not there on my regular rig were solid copy on the Omni VI. For more info or to place an order for yours: phone Ten-Tec at (423) 453-7172, or write to Ten-Tec at 1185 Dolly Parton Parkway, Sevierville, TN 37862. Price of the Omni VI is $2,585.00 – not cheap to be sure, but the best never is!

Kenwood VC-H1

I reported on this unit in Oct '98 and am still thrilled with the concept – an HT-sized slow scan TV unit, completely self-contained and able to operate all the most popular SSTV modes, including the new FM mode. Since Kenwood came out with the VC-H1, I have been working more and more folks on SSTV on bands other than 75 or 20 meters.

The VC-H1 comes complete with its own digital camera which can store ten photos and has a built-in mike and speaker. The VC-H1 can be used with any transceiver provided you have a matching cable for the rig: it arrives ready to run with any Kenwood transceiver. If you are interested in the mode at all you should own one. Price runs about $430. For more info contact Kenwood at PO Box 22745, 2201 E. Dominguez St., Long Beach, CA 90801.

MFJ 259B Antenna Analyzer

If you like to work with antennas, this unit is a "must have." The 259 allows easy tune up of antenna transmatches, lets you read standing wave ratio (SWR) and complex impedance, return loss of coax, velocity factor (VF) of feedline, coax cable loss, and distance to a short or open in your line, and many other functions. The 259 operates over the frequency range of 1.8 to 170 MHz.

For full info check out MFJ's ad in *QST* or contact MFJ at Box 494 Miss. State, MS 39762 or check into their web site **http://www.mfjenterprises.com**. Going price of the 259B is $249.00.

ARRL Antenna Books

Among the many books published by the American Radio Relay League is the ever popular *Antenna Book* (price $30.00) and *Wire Antenna Classics* (price $14.00). The *Antenna Book* is a complete education in antenna theory and construction. There are many useful projects described, and the book provides all the information you need to choose which antennas are best for you.

Wire Antenna Classics is a more basic book that describes in full detail to build, match and erect popular wire antennas. The information in this book will get you started on your way to an antenna building hobby. Both books are available from local ham dealers or the ARRL 225 Main St. Newington, CT 06111, phone (860) 594-0355.

The Pouch

My HTs take a beating and over the years I have tried many different cases in an effort to protect them. Most work to some extent, but a few months back I came across "The Pouch." This protective neoprene case is super, it is well padded, has a secure belt clasp, and comes with a web belt loop. A bungee type cord holds the radio and belt clip inside a water resistant carrying case. Prices vary on The Pouch, so call them at 1-800-727-6824 for price on your particular requirement.

Lakeview Mobile Antennas

Lakeview has been making mobile antennas for a long time. The major feature of their antennas is they are simple to tune, inexpensive and work very well. The Ham Stick antenna is available for all bands from 75 through 6 meters at prices under $25.00 each.

A new and very welcome addition to their line is a license plate mount for all mobile antennas. Price is $44.95 and well worth it, considering it saves drilling a hole in that new 25 kilobuck hunk of hardware you drive around in. For a catalog and more info on these fine mobile antennas contact Lakeview at **www.hamstick.com**, phone (864)226-6990 or via USPS at 3620-9A Whitehall Rd, Anderson, SC 29626.

Ten-Tec 2 Meter All Mode

If you have been wanting to try 2 meter SSB or CW an easy option is available from Ten-Tec in the form of their model 1210 two meter all mode transverter. This little unit will take the ten meter output from your HF rig and convert it to ten watts of all mode 2 meter output. Price is $139.00 for kit and $239.00 wired and tested. Check out the other kits available from Ten-Tec while you are at it. Available from Ten-Tec as above.

The Ant Farm

As most of you know, I own a small antenna manufacturing business called The Ant Farm, and have for many years been producing reasonably priced antennas for the ham and SWL. The Ant Farm MB-1A is a 94 foot center fed antenna designed to work 160 to 10 plus WARC (World Administrative Radio Conference) bands; the antenna was designed to work with auto-transmatches, and will cover any frequency in the HF ham bands without a glitch. Fed with 50 ohm coax, the antenna is available for $50.00 postage paid in the 48 states.

A second all band antenna designed to operate with auto-transmatches is the MB-2A. The MB-2A is 47 feet long, works 80 thru 10 plus WARC with superb performance. This is an ideal antenna for the ham with restricted space; put it up as a sloper, horizontal or vertical. Price is $45.00 ppd in 48. Several other antennas are available; send an SASE for a catalog to Ike Kerschner, N3IK, 6347 Chapmans Road, Allentown, PA 18106.

That's all for November; keep the cards, letters and e-mail coming, gang! Happy Thanksgiving to one and all de Ike, N3IK

Jock Elliott, KB2GOM
lightkeeper@sprintmail.com

The Oregon Scientific WR-102 Weather Radio

Mark Twain once quipped that "Everybody talks about the weather, but nobody does anything about it." Mr. Twain certainly was right.

Every state in the Union suffers from severe weather in one form or another: lightning, tornadoes, damaging winds, hail, extreme heat, extreme cold, flash floods, river floods, coastal storms, hurricanes, blizzards, ice storms, drought, and even the occasional tsunami.

In 1997, (the last year for which a summary is available), the National Weather Service reports that there were 600 weather-related fatalities. Floods accounted for the greatest number of deaths (20%), followed by winter storms and blizzards.

There were nearly 3,800 injuries, with tornadoes causing 27%, followed by winter storms (15%) and extreme heat (14%). Severe weather cost the nation well over $10 billion in 1997. Floods caused $6.9 billion in damage. Tornadoes were a distant second ($730 million), followed by winter storms ($688 million) and tropical storms and hurricanes ($667 million).

The bottom line: wherever you live in these Great United States, sooner or later, severe weather will come visiting you. And when it does, you don't want to be like the guy from upstate New York who was surfing the Internet when a tornado came along and blew down his house. He lived to tell the tale.

A far better way to operate is to make good use of the National Oceanic and Atmospheric Administration Weather Radio system. This network of more than 480 stations covers most of the United States and associated territories with round-the-clock weather forecasts, warnings, watches, and other hazard information. These stations broadcast on: 162.400, 162.425, 162.450, 162.475, 162.500, 162.525, and 162.550 megahertz.

Special weather radio receivers are available from various commercial suppliers in different "flavors." Ordinary weather radios simply will receive weather information whenever they are turned on and tuned to the local Weather Radio frequency. Alert radios can sit in standby mode until the local Weather Radio station broadcasts a special tone, causing the receiver to "wake up" and make audible whatever warning is being broadcast.

The most sophisticated Weather Radio



receivers, however, include the capability to receive a digital code (Specific Area Message Encoding, or SAME for short) for each specific county in the forecast area. So, if you don't want to hear all the alerts for the counties that surround your area but only want to hear alerts for the county where you live, you can program your SAME-capable radio to do just that.

This one's got it all

Recently I tested a new weather radio that seems to have it all: the new Oregon Scientific WR-102 handheld All Hazards/Weather Emergency Alert Radio with SAME reception. This bright yellow, weather-resistant portable radio is designed for use by travelers as well as hikers, fishermen, campers, boaters, and others on-the-go who love the great outdoors. It receives continuous 24-hour National Weather Service broadcasts as well as emergency weather warnings plus alerts about other conditions affecting life and property, such as explosions, fires, air quality warnings, and other technological situations.

It can be user-programmed to receive and display alerts, watches and warnings that apply only to a user's local area. Using the SAME capability, up to six individual counties can be programmed into the radio's memory. This sets the radio to receive emergency messages that pertain only to a user's home county and/or nearby counties, vacation destinations, summer home, office, etc.

This programming eliminates the reception of "false" alerts that might apply to an area up to 40-50 miles away. The WR-102 digitally tunes all seven NOAA Weather Radio channels across the country. An Automatic Alert System sounds a loud warning tone to announce an emergency broadcast, activates the radio's speaker when in silent standby mode, and triggers two additional visual alerts – a flashing red light emitting diode and the words "warning," "watch" or "statement" on the radio's display.

Appearances

The WR-102 measures about 2-3/4 inches wide, about 1-1/8 inch deep, and about 4 inches tall, excluding a stubby "rigid duck" antenna. On the face of the radio is a small speaker grill, buttons for controlling mode, channel and county codes, and a liquid crystal display that serves as information central. At the touch of a button, bright backlighting illuminates the display, which includes a large, highly legible 12/24-hour clock with two daily alarms, snooze capability and a calendar.

On the top of the case is a jack for an external speaker or earphone and a button for selecting among alert options. On the righthand side of the case, you'll find a jack for an external AC power supply and the button that controls the snooze function and activates the backlighting of the display.

On the left side of the case are up and down buttons that are used to adjust volume and perform various programming chores. On the back of the case is a hatch for three AA batteries. Also included with the WR-102 is a wrist strap and a neat plastic belt holster that the radio can be slipped in and out of at a moment's notice.

The WR-102 delivers excellent performance. The receiver is sensitive yet fairly immune to external noise. Programming is straightforward, and the evenness of the backlighting makes the display easy to read at night. In all, this is an excellent piece of gear, well thought-out and well executed.

The suggested retail price of the WR-102 is just $69.95. For more information, contact Oregon Scientific via email: *info@oregonscientific.com*, visit their website **www.oregonscientific.com** or call 1-800-853-8883.

John Catalano, PhD
j_catalano@conknet.com

The Duality of Life on the Internet

Everything in life has a dual quality. There is a good side and bad side. (No, I'm not quoting from Yoda.) The Internet is no different. It can bring lots of pleasure and knowledge, as we will see next time with a Web Tuner Radio, Jet Radio.

Or, the Internet can bring nothing but expense and pain. This month follow me to the dark side of on-line buying. Maybe you can save yourself some grief, money, and learn from my mistakes.

The Gulf Coast of Florida is a beautiful place. Sanibel and Captiva Islands have given us memorable beach walks and shelling experiences. I'd go back in a minute. But, recently I dealt with a company that sells computer components on the Internet and at hamfests. Checking their Website you'd see that the company was named after their Florida location. The same location that I once associated with pleasurable experiences now only brings me the memories of deception, lost weekends, all-nighters of effort and wasted money.

As a businessman, I know that the object of any business is profit. However, profitability, integrity, honesty, and customer service are not mutually exclusive. They can, and should, co-exist. This win-win business approach between a company and its customers benefits everyone – that is, everyone who is not greedy. It brings customers back for repeat buys, it makes the company a better place to work for the employees, and it improves the short lives of all concerned.

Civilization's first form of business, immediately following the "caveman" era, was bartering. Crops, or goods you possessed, were traded to the members of your community for items which you required and they possessed. In this business climate, dishonesty resulted in social banishment and occasionally much worse. The motivation for business ethics was directly related to the need to co-exist with your community (i.e., customers).

Enter Internet Trading

The impersonal, long distance, and nearly total anonymity of the Internet runs counter to the original motivation behind business ethics. Except for one important factor: We, as a society, are purported to have evolved and advanced past the primitive "caveman" mentality. Some social scientists would call it development of higher sociological needs and self-actualized goals.

Unfortunately, some see the Internet as a convenient mask that gives them the opportunity to sell and run.

Your Friendly Internet & Ham Show Vendor

How does a Pentium 233 MMX motherboard at $15 sound?! At an early May 1999 hamfest, with documentation, I/O cables and full replacement guaranteed, it was irresistible. I bought three. However, I asked for, and received, a receipt and their business card ... just in case I had a problem.

Point One: Guarantees are great. But you must be able to act on the guarantee if required. *Always* get a business card, or the name, address and telephone number of the guaranteeing seller. Chalk up one for John.

After I found some precious and rare "free time" I fired up the motherboards using components from my vast computer supplies. (The same ones that usually invoke the comment from my wife, "Your third floor office is going to collapse into the basement with the weight of that computer junk!") Two motherboards worked fine, but one was dead.

Calling the telephone number on their letterhead I was greeted with a strange, "You didn't buy it from us. But we do sell computer parts, check our website." In shocked surprise I checked their website and found they had my exact motherboard. I emailed them with this fact and faxed a copy of my receipt on their letterhead. Point One was working. I received an email from them and was instructed to send them the board and they would determine if it was one of theirs.

Point Two: If a company is reluctant to accept their own documentation (receipt) as proof of purchase, stop right there until they agree unconditionally to take responsibility. As you will see, I did not handle this phase correctly.

Expecting Too Much Honesty

Finally, it seemed that I was about to receive some customer consideration. In an attempt to show my appreciation for the assistance I thought they would provide, and after checking out their website, I ordered two additional motherboards and three Pentium 233MMX processors from their website. Although competitive in price at $46, the Pentiums were not the lowest advertised in *Computer Shopper* by known, reputable companies. Also, the motherboard price had increased to $20 each.

However, I considered it a gesture of goodwill on my part and, desiring a win-win relationship, I ordered the items as per the Gulf Coast company's web page, and confirmed the order using a credit card via telephone. I was assured that the parts would "Go right out."

Point Three: If you order via Internet (or telephone) ask for a confirmation of the order, including all details (agreed items, price, shipping charges and shipping date) to be emailed, or faxed to you, before the close of business on that day.

Aw heck, John. Aren't you being picky?! Not at all (as we will see). An honest person is not afraid to write down a commitment. If the company is "real" it has to generate an invoice when it charges your credit card. Emailing/faxing you a copy is not problem – if it is really done when promised. Here, I really blew it.

Fast-Forward Eight Days.

Still nothing from the Gulf Coast guys. I called them and was given the "it was just shipped" story. But when I asked for a shipping tracking number was told that they would call me back with those details. It took two more telephone calls from me and three days before I got a shipping number. Getting suspicious (I'm a slow learner), I called the shipper who informed me that the package had just been put into their system (just mailed) by the sender. Well, at least it was finally on its way. Right?

When the package arrived the motherboards were there. But since the wrong I/O cables were sent they were useless. Worse still, no Pentium processors! A quick grab at the enclosed receipt showed that they didn't forget to charge my card the total amount, including the Pentiums. How could this be happening? Incompetence or something more malicious?

Point Four: Immediately write to the company with your complaint and date the letter



including as much detail as possible (the dates, times and people you spoke with at the company). DO NOT rely on email or telephone conversations.

"I was too busy with my life and work." Not an excuse. If you had the time to place the order, *make* the time to follow it carefully. If you don't, no one else will!

Wrong Again!

After a number of, emails, telephone calls and another ten days (this thing had now been dragging on for weeks), I received a package with the correct drive cables, three "233 MHz" Pentium processors and chip specification sheets. They arrived just in time for a weekend of computer building. I had promised my niece an Internet machine and I needed two for work.

By late Sunday night I had invested the whole weekend building computers using the motherboards and the Pentium processors. But I had a big problem. Windows 95/98 crashed at the end of every installation. They seemed to work if I just installed DOS 6.2. "How could this be?!" I despaired as I realized my weekend was gone (as well as possibly my marriage).

Was it my memory chips? My power supply? My hard drive? As I fell asleep at 5:30 a.m. Monday morning, I decided to check the details of the "233 MHz Pentium" chips that I had bought from the Florida people, on the Intel website.

Two hours later I dialed-up the Intel website, but could not find the number printed on the Intel "233 MHz" Pentium that the company has sold me. After calling Intel I was informed that the number and package type did not check out. Intel said the chips were not 233 MHz Pentium. In fact, a representative of Intel's legal department called a few days later and said they didn't know what I had, or if it was even an Intel device. They took down all my details and suggested I call the fraud department of the Florida district attorney's office.

Point Five: If you seek the help of an original manufacturer, or other reputable source, ask them if they are willing to support you and intervene on your behalf with the selling company.

Here, I was out on a limb by not dealing with an Intel reseller. Intel said they would start an investigation.

Will It Ever End?

Following a hunch, I tried the "233 MHz" processors at 100 MHz and they worked. But when I retried them at 233 MHz they once again failed.

Before I took Intel's advice, I gave the seller one more try. Via email (wrong again, John) I gave the company in Florida one more chance to explain. How was I sold Intel 233 MHz Pentiums, which Intel said were not Pentium 233 MHz chips? In any case, they did not work at 233 MHz in a Windows 95/98 environment. I asked that they be replaced with real 233 MHz Pentiums, as advertised, ASAP.

The company's email response, a few days later, echoed the tactics practiced by hucksters everywhere; why should the Internet be any different? After weeks of emails, telephone calls, wrong shipments and worse, their response to a patient, paying customer was:

" Hi, Sorry this is happening but B_ _ is out of town for about five weeks, and I have no authority to authorize the sending of more CPU's – which we do not have anyway. Sorry,"

An End to the Story

That email was over nine weeks ago and I have not heard a word from this "gentleman." Would even a primitive caveman consider this a way of doing business?

Point Six: Once you exhaust all reasonable possibilities when dealing with a seller, either pursue a legal remedy, or cut your losses and run. At the very least you have learned not to deal with this, or similar individuals or companies. Knowledge is expensive. Once gained, use it.

Summation

I had paid more than twice the price I should have for these old useless CPUs and added telephone, fax and shipping costs. I wasted invaluable weeks of time. And today, I still did not have 233 MHz computers. I should have followed the Six Point plan.

And, oh yes, my original defective motherboard that started it all – never replaced. Incompetence, or something more malicious? You be the judge of this Florida Gulf Coast company.

Since this experience I have heard from many with "remote buying" and "friendly ham vendor" horror stories. Just take a look at some of the bitter buyer feedback on Internet auction sites. Now, don't get me wrong. Most of the people, and companies are "straight-shooters," but not everyone is. The number of "dodgey" sellers is growing.

Be careful and try using the Six Point method. Limit the amount of the transaction you are willing to do with "unknowns." For large ticket items I suggest *only* buying from reputable, known dealers. Buying from an unknown to save $30 on a three hundred dollar purchase is not a smart move.

And now you've seen the other side of the wonderful Internet. The Romans did not have the Internet, but they had a phrase for Internet buying, "Caveat Web Emptor." Well, almost.

The Positive Side of the Internet

Next month we'll explore the positive side of this great resource called the Internet with Jet Radio as our prime focus. The Jet Radio program's operation is analogous to a shortwave station logging, database and receiver tuning program, but just for the Internet. An Internet Radio. Till next time ...

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The Author of this column does not wish to have his material republished

WiNRADiO vs. ICOM:

By *MT* staff

With two prominent companies head to head in the computer-controlled receiver market, it is understandable how the public – and the dealers – are confused. Until the recent price drop in the PCR100, the ICOM and the WiNRADiO products were not that far apart in price. So which is the better value?

MT has never directly compared these two external models, though John Catalano compared the PCR1000 to the WR1000i (internal card) in the April 1998 issue. At that time he said "The WiNRADiO seemed to do better than the ICOM in the 21 to 50 MHz range. The ICOM seemed to be more sensitive in the wide FM mode in the 88-108 MHz range." However, the WR1500e (external unit) has made marked improvement in its sensitivity on VHF/UHF over the WR1000i (see Nov 98 p. 94).

Catalano also reported that the ICOM seemed to produce stronger, cleaner signals in all modes over the WR1000i and strength of observed birdies was lower in the ICOM.

Both products have their advantages and disadvantages. The WR has an amazing spectrum analyzer that works extremely well; the ability to drag a cursor with a mouse and instantly access any frequency in the displayed spectrum is a pleasure. The ICOM has a narrow-span bar graph that shows activity only on adjacent frequencies. The ICOM's finely-tuned SSB reception and 6 kHz AM selectivity are better.

Ultimately, it may be fair to say that the ICOM is better suited to HF, and the WR to VHF/UHF and for spectrum display – a conclusion that seems to be borne out in the hands-on reviews by John Catalano as well.

The most typical question about the two products is "How do the ICOM and WR stand up against communications receivers?" The simple answer is, "Not well." These are entry level, computer-controlled receivers designed to fill a niche. Remember, they are in the $500 range. Follow-on products from both manufacturers may take the serious listener to the next step, but at an increase in cost.

MT REVIEWS:

Computers & Radio	
WiNRADiO	Sep, Oct 1996
PCR1000	Feb, Mar 1998
WR1000i vs PCR1000	Apr 1998
WR1500e	Oct, Nov 1998
MT Review	
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Uniden BC278CLT Scanner

Night tables are too small. That's the conclusion I came to long ago, after trying to fit an FM monitor receiver, AM/FM broadcast radio, and an alarm clock on the night table next to my bed. It's now 30 years later, and Uniden has a new combination scanner radio and alarm clock that will fit on the smallest of night tables.

The BC278CLT (Fig. 1) is the first Bearcat scanner to provide an alarm clock function and cover both the AM and FM commercial broadcast bands. Regency flirted with the scanner clock radio paradigm in the past. The old Regency K500 contained an alarm clock but no AM or FM broadcast band. The later Regency Z60 (Fig. 2), which was housed in a sloping, clock radio type cabinet, covered FM and had an alarm clock function, but didn't tune the AM broadcast band.

The Uniden Bearcat BC278CLT is a 100-channel, double conversion scanner manufactured in the Philippines. It is designed for base use only and is powered by the supplied 10 VAC wall transformer.

The frequency coverage is 520 - 1720 kHz, 88 - 108 MHz, and the conventional scanner bands including the 800 MHz and civilian air bands. Cell phone coverage is, of course, excluded in the US version. A 7-inch loop antenna (Fig. 3) is provided for AM BCB reception and its feedline attaches to a 2-pin connector on the rear panel.

Memory Features

There are 100 programmable memory channels, organized in five banks. Each channel can be locked out from the scan list, and a 2-second rescan delay is selectable on a per-channel basis. Empty channels are skipped automatically, and channels containing duplicate frequencies are detected. Uniden claims the memory information is backed up indefinitely, but the clock must be reset after a substantial power failure. The time remained intact when I unplugged the scanner for 2 minutes or so.

AM and FM broadcast band frequencies are allocated in separate 10 channel banks. Too bad they cannot be programmed using the numeric keypad. They must be programmed like a car radio instead. You are constrained to tuning up or down the band and pressing E to save the displayed frequency into memory. It would be much simpler if you could program your favorite country music station by pressing 99.5 E, for instance, but you cannot.



FIGURE 1. *Uniden BC278CLT combination scanner and clock radio*

Scanning and Searching

The BC278CLT may be used as a scanner or AM/FM radio, but not both at the same time. You can scan any combination of the five VHF/UHF memory banks. The scan rate is slower than Turbo Scan models and my radio scanned at about 19 channels/sec. One channel per bank may be designated as a priority channel, which is sampled every 2 seconds when priority scanning is enabled.

You can program one pair of search limits and the BC278CLT will search frequencies between them. My scanner searched at about 23 steps/second. You can pause a search operation and step up or down in frequency manually by pressing the appropriate keys. Up to 10 frequencies may be locked out from a limit search.

The BC278CLT does not support a direct search facility, which would permit searching up or down from the currently displayed frequency. A Service Search menu is provided for scanning preprogrammed frequencies in categories named Police, Fire/Emergency, Air, and Marine. Pressing the WX key can search seven preprogrammed NOAA weather frequencies.

If the weather alert feature is active, the BC278CLT sits silently until the NWS (National Weather Service) transmits the proper signal, which causes the scanner to beep and open the squelch. The NWS can broadcast messages to specific geographic regions by transmitting the appropriate SAME (Specific Area Message Encoding) codes, and you can program up to 15 SAME codes in the BC278XLT. The scanner displays different indicators for warnings, watches, weather statements, and tests.

Big Knobs, Nice Display

The BC278CLT is housed in a dark gray plastic cabinet. The speaker and all controls are mounted on the top, at a slight angle. The large knobs are very easy to use, much better than "dust magnet" slider controls or the tiny bar-like knobs on the BC9000XLT which elude my grasp.

The LCD display is different from previous models. Most impressive is the huge size of the frequency digits. You can actually read them without squinting! The display is backlit is brightly lit in soft green in scan, manual, and weather modes. In other modes, the backlight remains bright for 10 seconds, then reverts to dim illumination. Pressing any key will temporarily force the backlight back to bright – a thoughtful arrangement.

Large, soft rubber feet prevent the BC278CLT from sliding around.

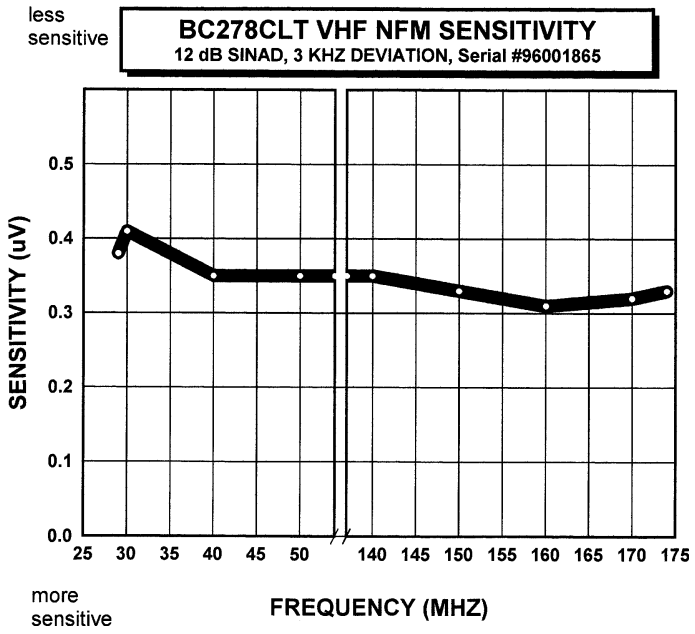
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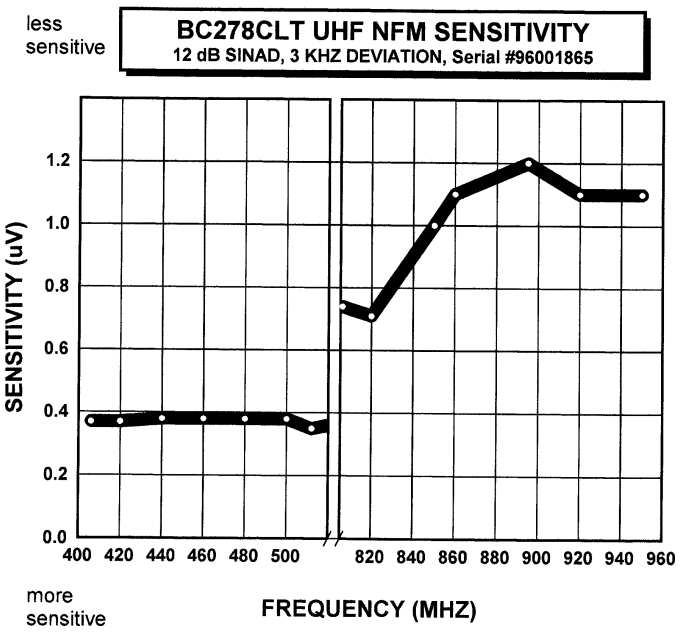
The telephone industry, through the FCC, is pressuring manufacturers to rid scanners of cellular telephone images, and hobbyists are the beneficiaries. The newer double conversion Uniden scanners, including the BC278CLT and BC245XLT (see September 1999 *MT*), exhibit outstanding image rejection compared with their ancestors of 5 years ago.

The loaner BC278CLT (s/n 96001865) worked well. I measured several performance parameters and the quantitative results appear elsewhere in this review. The sensitivity, modulation acceptance and audio output of this BC278CLT are quite reasonable. Audio from the top mounted speaker is pleasant, though with accentuated treble. A rear mounted 1/8" jack permits connection of an external speaker.



FIGURE 2. *Regency Z60, an early combination scanner and clock radio, lacked AM broadcast coverage (RELM photo).*





MEASUREMENTS
UNIDEN BC-278CLT SCANNER
S/N 96001865

List price $179.95
Uniden America Corp.
4700 Amon Carter Blvd.
Fort Worth, TX 76155

Frequency coverage (MHz):
0.520 - 1.720 (10 kHz steps)
88 - 108 (100 kHz steps)
29 - 54 (5 kHz steps)
108 - 137 (AM, 12.5 kHz steps)
137 - 174 (5 kHz steps)
406 - 512 (12.5 kHz steps)
806 -823.9875, 849.0125 - 868.9875,
894.0125 - 956 (12.5 kHz steps)

Sensitivity:
see graphs

FM modulation acceptance:
12 kHz

Intermediate Frequencies:
10.85, 0.45 MHz

Image rejection:
50 dB at 155 MHz, 50 dB at 860 MHz

Audio output power at speaker jack:
550 mW @ 10% distortion into 8 ohms

Practical memory scan speed:
19 ch/sec.

Search speed:
23 steps/sec.

Birdies can be heard on 41.6, 52.0, 165.3, 407.7625, 407.8125, 413.175, 413.225, 813.4, 814.95, 815.8, 815.85, 823.8, 849.35, 899.2375, 906.4125, 906.5875, and 926.7 MHz. That may seem like a long list, but it's a lot better than the older BC890XLT I tested, and most of the BC278CLT birdies fall on frequencies I don't monitor.

The weather alert feature worked as advertised during the weekly NWS test transmission.

Overall

I was impressed with the BC278CLT. It's certainly not in the "Lincoln Town Car" category, but it performs much better than some of radios sold us 10 years ago. Its weather capabilities, large knobs and display are appealing. I wouldn't hesitate to keep it on my nightstand or recommend it unless you require a trunk tracking capability.

Note on the BC245XLT

Reader Mike Chace commented on the portable Uniden BC245XLT Trunktracker II we reviewed in the September 1999 issue:

"Just read through your review of the BC245XLT and had a comment. It may be just due to my downtown Philadelphia location, but my '245 is way too sensitive and intermod prone around 930 MHz. I have to listen with just the helical antenna (and attenuator switched in) to anything on the 935-940 MHz trunked portion, since connecting the outside antenna totally shuts down the front-end."

Mike continues, "The radio generates plenty of intermod even with no antenna connected,



FIGURE 3. ***Supplied 7 inch AM loop antenna (base stand not shown).***

and selectivity also suffers at this frequency – take any strong trunking control channel at 930 MHz and it is audible 25 kHz either side of the true center frequency. Performance at 800 MHz is better, but not by much. I guess your sensitivity plot tells the story there..."

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MORE ON AIRCRAFT ANTENNAS...

Jacques d'Avignon, *MT*'s Propagation columnist, adds to our previous September column a few more observations about aircraft HF antennas:

"In many cases the front section of the vertical stabilizer in the tail assembly is insulated from the rest of the aircraft and is used as a vertical antenna via an antenna tuner.

"On some long range aircraft, 747, and large military aircraft, you will often see a long probe sticking out from the trailing edge at the wing tip of the port side wing; that is also an HF antenna. This particular configuration is normally used with some fairly high power transmitters and it is not unusual for aircraft on the ground to be able to communicate with their base half a world away."

Thanks, Jacques.

***Q.** Surfing through the Howard Stern Show last night, I was disgusted to see a commercial for what appeared to be a Uniden Sportcat 150 emphasizing the scanner's ability to monitor cordless phone conversations, and showed a young man listening in on his neighbors. The advertisement closed by saying, "Get one now - and find out what's going on in your neighborhood."*

I know that the industry has worked hard to overcome the images of the eavesdropping scanner owner, spying on the neighbors. This promotion of an illegal act is sure to be used by the politicians and legislators who aim to eliminate the monitoring hobby as we know it. Why doesn't Uniden or the FCC put a stop to it? It is bound to damage Uniden's business in the long run.

A. This commercial spot has been running for the better part of a year now, and my two complaints to the FCC, which included sending them a videotape showing the promotion of this Uniden scanner for criminal purposes, has been ignored. I would appreciate any of our readers seeing this ad reporting to me by e-mail or toll-free phone (800-438-8155) the company advertising this illegal purpose, any phone number and address, and where you saw it. A videocassette of the commercial would help immeasurably. I'll follow up on it with the FCC and with Uniden.

***Q.** Seven Family Radio Service (FRS) channels are shared with the General Mobile Radio Service (GMRS), but FRS uses narrow bandwidth (2.5 kHz) deviation compared with GMRS (5 kHz). Is it correct to assume that the FRS signal would suffer low audio when heard on a GMRS radio, and the GMRS signal would have clipping distortion when heard on an FRS radio? (John Griffin, KB2SGJ, Hillsdale, NJ)*

A. Your conclusion is theoretically correct. In actual practice it depends upon just how sharp the selectivity filter is in the FRS radio, and how much actual deviation is present on the GMRS radio as to whether the reception would suffer. Similarly, it would depend upon how much deviation (modulation) is present on the FRS signal as to how strong the audio would be when received on the wider-bandwidth GMRS radio. I've not heard a single report from any users either way.

***Q.** How do you maximixe the performance of a portable shortwave radio while riding in an automobile? (Philip Spayd, Scituate, MA)*

A. There are three problems which must be overcome with a portable shortwave receiver in an automobile:
(1) The vehicle's shielding, which resists penetration of the longer wavelength signals from reaching the radio's antenna;
(2) The short length of the antenna relative to the wavelength of the reception for proper matching; and
(3) The electrical noise generated in a mobile environment.

First and foremost, the antenna must be mounted on the outside of the car; the longer the antenna the better. A full-length (102") CB whip is a good choice. Generally speaking, the rear of the vehicle (like a bumper mount) is the best location because it is farthest from the engine compartment's electronics and spark generating devices.

Ideally, you would use an active antenna; the H800 Skymatch is a good choice because it not only properly matches the antenna impedance, but it has amplification as well.

***Q.** I listen to shortwave utilities and wonder why upper sideband (USB) rather than lower sideband (LSB) seems to be the universal choice for voice communications. (James P. Ashe, Weymouth, MA)*

A. There is no technical advantage of one sideband over the other; it is a matter of standardization and spectrum efficiency. U.S. Air Force flights used to switch to LSB when involved in diplomatic communications ("Mystic Star" network), but that practice was discontinued several years ago. By knowing that USB will always be the favored mode for calling, it is less likely that a transmission will be missed because one side of the link is monitoring the opposite sideband.

Hams conventionally use LSB in the 1.8, 3.5, and 7 MHz bands, and USB on higher frequencies through 29 MHz, but can select either mode.

***Q.** Is there a limit to the amount of voltage a small wire can handle? For example, could a piece of 16 gauge wire carry 250,000 volts at 1 amp of current? (Mark Burns, Terre Haute, IN)*

A. High voltage is no problem; even megavoltage Tesla coils with their dramatic electrical fireworks use small gauge wire. Damage is caused by current (amps) – the density of electrons moving past a point at any instant. In your example, only 1 amp of current is flowing, so the density of electrons isn't going to do a bit of harm.

The high voltage, however, does require considerable isolation from nearby conductors, or else plenty of insulation. A spark in dry air jumps approximately an inch for every 25,000 volts or so; your example could zap something nearly a foot away!

Bob's Tip of the Month

More Earphone Audio on Bearcat Scanners

For years, owners of Bearcat handheld scanners have complained of not having enough earphone volume in noisy environments. The reduced volume is intentional; it is to prevent hearing damage from "blasting," loud bursts of sound that may injure the delicate sensors of the inner ear. But this precaution also limits the effectiveness of external speakers.

Uniden lowers the sound level by the simple expedient of placing a resistor in series with the audio line to the earphone jack – and it's easily defeatable. The best part is that no surgery is necessary, and it can be done in seconds!

To test whether the fix will work on your Bearcat handheld scanner, simply plug in an earphone or external speaker into the jack, and temporarily touch the ends of a small wire between the barrel of the 'phone plug and the adjoining antenna jack. If the sound level increases, that's the ticket!

For a more secure fix, take a small length of small gauge, solid wire, and wrap a turn or two around the barrel of the earphone or speaker plug, and the other end around the base of the antenna connector. That should do it.

Years ago, an enterprising entrepreneur actually manufactured commercial jumpers for the popular BC-100 and 200 scanners from fine-steel spring wire; it worked beautifully, but the small market didn't justify the continuation of the inexpensive product, so you will have to make your own!

Just keep in mind, if you use this fix with earphones and blow your ears out, don't blame Uniden!

***Q.** Were atomic clocks around early enough to coordinate the dropping of the atomic bomb on Hiroshima and Nagasaki? What other information is transmitted on the WWV time and frequency standard broadcasts? (Donald Michael Choleva, Eastlake, OH)*

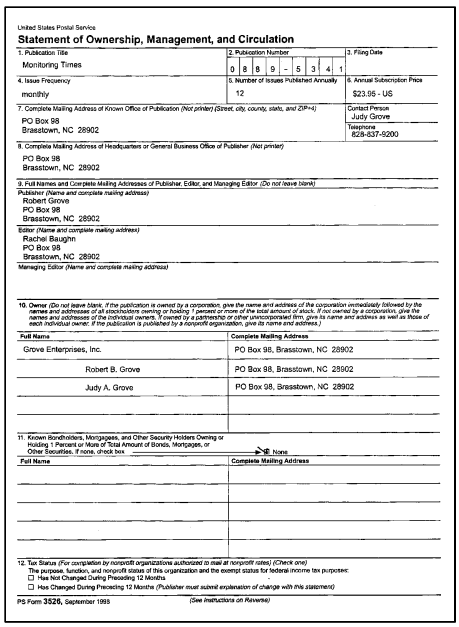
A. Although WWV first established its time and frequency information in 1923, the cesium beam standard was first implemented in 1951, six years after the close of World War II. The dropping of the atomic bomb over the two Japanese sites was coordinated more manually with considerations of weather, onboard mechanical clocks (chronometers), and the famous Norden bombsight, an analog computer which could place a bomb within a 100 foot circle at an altitude of four miles.

Besides accurate radio frequency, audio frequency, and seconds pulses, WWV also provides voice announcements concerning solar-produced influences on the earth's ionosphere, the electrically charged layer of upper atmosphere that alters the propagation of radio signals. Additional reports on major storms, scientific satellites, and station maintenance may be scheduled for broadcast as well.

***Q.** In your September column Mark Burns asked about why his vehicle's "Check Engine" light came on following a severe electrical storm. A similar thing happened involving the "Seat Belt" light on my friend's Saturn. Could it have been similiarly caused? The dealer found nothing wrong with the seat belts. If it's fixed, is it likely to recur after another electrical storm? (Ryan, e-mail)*

A. It certainly sounds plausible. Automotive manufacturers have technical support departments, and they should be contacted by the dealer or you if the dealer can't resolve the problem.

Although electromagnetic pulse (EMP) from lightning is a well-documented threat to solid state electronics, if the vehicle has a metal body, the wiring should be pretty well shielded from such induced high voltages. But if it's fiberglass…..



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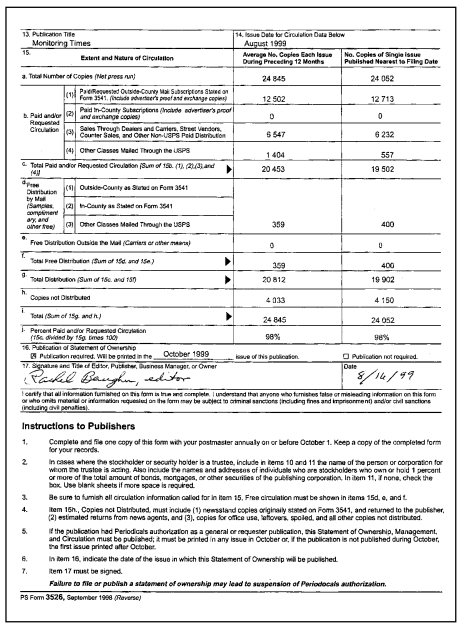
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h. Copies not Distributed	4 033	4 150
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j. Percent Paid and/or Requested Circulation (15c. divided by 15g. times 100)	98%	98%

16. Publication of Statement of Ownership
☒ Publication required. Will be printed in the October 1999 issue of this publication. ☐ Publication not required.

17. Signature and Title of Editor, Publisher, Business Manager, or Owner: Rachel Baughn, editor — Date: 8/16/99

I certify that all information furnished on this form is true and complete. I understand that anyone who furnishes false or misleading information on this form or who omits material or information requested on the form may be subject to criminal sanctions (including fines and imprisonment) and/or civil sanctions (including civil penalties).

Instructions to Publishers

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PS Form 3526, September 1998 (Reverse)

WASHINGTON WHISPERS

By Fred Maia, W5YI
fmaia@prodigy.net

The Coming Migration to Digital Radio

"Digital Audio Broadcasting (DAB) is a digital method of transmitting virtual CD quality audio signals to radio receivers. In-band, on-channel (IBOC) DAB is a broadcasting technology that uses the current radio spectrum to transmit existing AM and FM analog simultaneously with new higher quality digital signals. This technology is designed to provide a unique opportunity for broadcasters and listeners to convert from analog to digital radio without service disruption while maintaining current dial positions of existing stations. Listeners who purchase digital radio receivers will receive their favorite radio stations with superior sound quality free from static, hiss and noise, and with reduced interference. Additionally, listeners would have the capability to receive expanded auxiliary data services, such as station and program content, stock and news information, local traffic and weather, email and Internet access, and more."...explanation from USA Digital Radio.

Broadcast radio is the primary source of information and entertainment for thousands of communities across the country, providing music, news, weather, traffic and local information to listeners. There are more than 12,500 AM and FM broadcast radio stations in the United States. Americans own more than 550 million radios. That's more than five per household. According to Arbitron, more than 95% of all people over the age of 12 listen to the radio more than 22 hours per week.

According to recent research conducted by Lucent Technologies, fifty-six percent of all radio listeners want digital radio that will make FM sound like a CD and AM to sound more like FM.

FM radio stations sound better than AM because the band is higher in frequency (88-108 MHz) and less susceptible to natural interference. And FM channels are wider than AM which permits better frequency response. However, today's FM signals are plagued by "multipath," an annoying type of interference which results when radio signals bounce off of buildings, mountains or other obstacles. Digital audio broadcasting eliminates both multipath interference for FM and impulse noise and static for AM. Digital signals are not subject to interference.

Your standard or mine?

Digital audio radio (DAR) is internationally allocated to operate in the 1452 - 1492 MHz L band. In April 1997, however, the FCC decided to auction off DAR licenses in 25-MHz S-band blocks (between 2,320 and 2,345 MHz) because lower L-band frequencies were already in use by the military. Satellite CD Radio and American Mobile Radio were the winning bidders and both have said they will use satellites to deliver nationwide digital programming with CD-quality sound.

DAR was first presented as a concept called the "Eureka System." A digital signal would be either a satellite-based (extra terrestrial) system, whereby the signal would be uplinked to a satellite and distributed to satellite receivers, or an earth-based (terrestrial), antenna system whereby a given number of stations could transmit from a central site to receivers in the immediate area.

Now a second system has arrived which is referred to as the "in band, on channel (IBOC) system" which is widely supported by land-based broadcasters. IBOC is a combination system that offers both analog and digital signals on the same frequency.

There are two digital IBOC modes; Hybrid and AllDigital. The hybrid IBOC mode will be used during the transition period to allow listeners to receive their favorite radio stations using either current analog radios or new digital radios. At some point in the future, the hybrid mode will be switched off by the radio station to provide more digital power. This is similar to the way television was upgraded from black and white to color. Every black and white set still worked, but every viewer had the option of buying a color TV set.

In its final report to the FCC, the Consumer Electronics Manufacturers Association (CEMA), in Arlington, Virginia, backed the European "Eureka 147" digital-audio broadcasting system over IBOC. The Eureka system outperformed terrestrial IBOC digital systems in audio quality, signal performance, and noninterference to existing analog radio services. In short, the IBOC system CEMA tested did not work well and needed more development work. At the request of broadcasters, however, CEMA held off advocating the Eureka system until the flaws in the IBOC system could be corrected.

In November of last year, USA Digital Radio petitioned the FCC to make their improved IBOC system the industry standard. They designed their IBOC digital audio system to be an enhancement to current analog radio broadcasting. "Our technology places a high capacity DAB signal in the existing spectrum at the dial position already licensed by current broadcasters," they said.

FCC officials much prefer IBOC technology due to its minimized rulemaking and licensing burden and the fact that it does not require new frequency allocations. Existing broadcasters naturally want the capacity to broadcast digitally and like IBOC's lower introduction costs since existing transmitting sites, equipment, towers and antennas can be used. And there is the potential for quick regulatory approval.

The big advantage of IBOC to consumers is that it offers CD-quality sound without having to change to a different band. Consumers will of course have to buy a new radio to receive CD-quality audio, but their old radio will still work with the current analog stations.

Testing, testing ...

USA Digital and Lucent expect to begin testing their improved IBOC system later this year. The field test plan calls for demonstrating the IBOC system in different cities that mirror the operating environments in most of the nation's AM and FM stations. The initial major test markets for AM/FM digital radio will be New York (WCBS-AM 880, WNEW-FM 102.7); Washington DC (WETA-FM 90.9, WHFS-FM 99.1, WJFK-FM 106.7, WTOP-AM 1500); San Francisco (KLLC-FM 97.3, KYCY-AM 1550); Baltimore (WPOC-FM 93.1) WNOP-AM (740); and Cincinnati (WNOP-AM 740). The digital tests will be conducted under experimental licenses issued by the Federal Communications Commission.

New radio receivers will be needed in order to receive IBOC DAB signals; the first models should be available in about two years. Receivers are expected to cost between 15% to 30% more than current high quality radios, but prices should drop over time. Kenwood USA Corp., of Long Beach, California, is the first major manufacturer to enter into a joint technology and marketing agreement to provide the digital radio to consumers.

WHAT'S NEW?

TELL THEM YOU SAW IT IN MONITORING TIMES

Grundig Satellit 800 Millennium

If you fondly remember the big, beefy Grundig Satellit 600 and 650 models, you'll want to check out Grundig's new 14-pound Satellit 800 Millennium (See Grundig's ad in this issue). Grundig is known for its audio and the 800 should be no exception, with a large speaker and bass and treble controls; FM stereo is available through the headphones (provided) or external amplified stereo speakers.

The 800 tunes AM, FM, upper and lower sideband, and VHF aircraft band over an extensive range of frequencies: 100 kHz - 30 MHz, 87-108 MHz and 118-137 MHz. Tuning is by means of the manual knob (which does not mute the audio while tuning), keypad entry, or 70 memory channels. Three filters provide optional bandwidth: 6.0, 4.0, 2.3 kHz.



Advance specs claim excellent sensitivity and selectivity, synchronous detection circuit to reduce fading, selectable automatic gain control in slow or fast mode, and attenuator button. Other features include analog S-meter, ultra-fine 50 Hz single sideband tuning, large LCD panel display, and dual 24-hour format clocks and timers.

In addition to the oversized telescopic whip, antenna jacks are provided for SW, AM, FM, and VHF air band. An external speaker jack and line output jack are also provided. Power is provided by the included AC wall transformer or six "D" cell batteries.

MT reviewer Lawrence Magne says the Satellit 800, although made in China, is the first model created in cooperation with the R.L. Drake company in Ohio. Retailers such as Grove Enterprises (800-438-8155 or **www.grove-ent.com**) are expecting to sell the radio for $499.95; it should become available around the first of December.

PowerSafe 2000

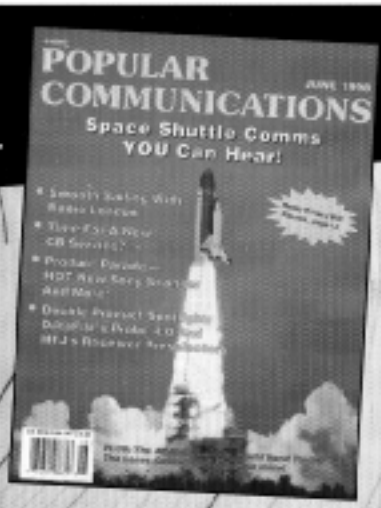
They claim it's not for Y2k, but the name gives it away – Cutting Edge Enterprises' sturdy, vented battery enclosure will provide a complete AC and DC power station that can safely be used indoors. You supply the 12-volt automotive or marine battery, but the PowerSafe 2000 takes care of concerns over regulating power or overcharging.



Three AC outlets, a three-port DC cigarette outlet, automatic circuit breaker, male cigarette plug to energize your equipment, and a fully automatic charger are all included. For extended operations, Cutting Edge has a line of accessories such as solar cells,

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lights, DX extension cords, etc.

A special sale price of $299.95 (down from $369.95) is effective through Dec 31, 1999. For further information, contact Cutting Edge Enterprises at 1803 Mission Street, PMB-546, Santa Cruz, CA 95060, 800-206-0115 or email *cee@cruzio.com*

AM/FM/ Weatherband Antenna for RVs



If your truck, van, or recreational vehicle has a non-metallic roof, you can dramatically improve AM reception and still receive FM and VHF weather band channels with the EV-LOOP from Everhardt. Consisting of a protected loop antenna which incorporates resonant wire lengths for VHF as well, the flat package is designed to fit within the headliner or sleeper in suitably-equipped vehicles.

A 12 foot length of coax cable with a Motorola plug is included for compatibility with the majority of OEM automotive radios.

For more information, pricing, or to order, contact Everhardt at 6000-D Old Hemphill Rd., Ft. Worth, TX 76134, or call (817) 568-0177.

MT Express makes its Web Debut

Monitoring Times is now available by subscription over the Internet! *MT Express* is identical to the hard copy magazine, but is delivered by file transfer protocol (FTP) – the first printed magazine to also be made available in soft format!

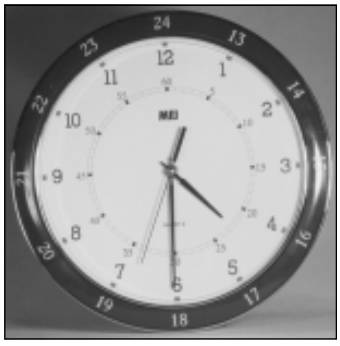
MT Express won't be for everyone, but it offers very real advantages for certain hobbyists. These include: faster delivery (1 to 2 hours download time as opposed to 3 to 10 days for mail delivery), the ability to import data into software programs (for use in database or radio-control programs), the ability to convert text into audio for sight impaired hobbyists, and the ability of hobbyists outside the US to subscribe without additional postage costs and delays.

Cost of the new *MT Express* is $19.95 (or an additional $11 if purchased along with a print subscription). See *Monitoring Times*' ad in this issue for more information or visit **www.grove-ent.com**.

Shack Clock

This attractive, 12-hour quartz wall clock from MFJ Enterprises would make an excellent gift for any radio hobbyist. The clear, 12-inch diameter face is outlined with thin gold trim, with the outer plastic ring in hunter green providing a 24-hour trimline. Hands and 12-hour digits are in black, and the seconds are marked off in red.

The MFJ-126 Clock runs on a single "AA" battery (not included), and sells for $24.95 from MFJ Enterprises (PO Box 494, Mississippi State, MS 39762; 800-647-1800 or **www.mfj enterprises.com)**.

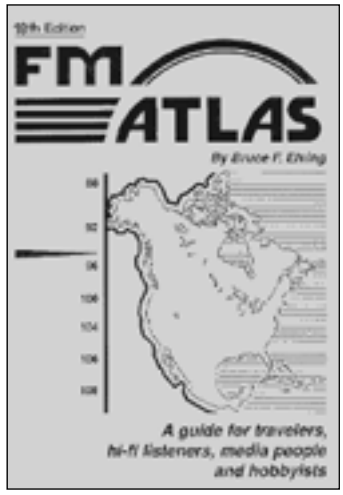


New FM Atlas Ready

Bruce F. Elving has produced the 18th edition of the *FM Atlas*, a 240-page book with text, maps and directory listings for 10,500 FM stations in North America. The book is recommended for industry people, travelers who want to listen to their program format of choice, or DX hobbyists who enjoy tuning in and identifying all the FM stations it is possible to receive from a given location.

The 1999 edition includes a summary of FM broadcast developments culled from the previous two years of Elving's companion publication, *FMedia!* It also includes new and updated maps of the U.S., Canada and Mexico showing FM station locations, call letters and frequencies, and directories by geography and frequency. Program formats, technical parameters and coverage radii are figured out for all of the stations.

The book is unique in showing which stations have an SCSubcarrier at 57, 67 or 92 kHz, as well as those without an SCA. FM translators and boosters are also shown on the maps and in the directories following each state.



FM Atlas was printed by McNaughton & Gunn, Saline, Michigan, and is available at $19.99 plus $2 shipping from "FM Atlas," PO Box 336, Esko MN 55733-0336; (218) 879-7676 or visit **http://users.aol.com/fmatlas**

The Ultimate TIS Resource

If you enjoyed our feature article on Travelers' Information Stations, you'll be fascinated with "Bill's Ultimate TIS Digest" – a website maintained by Bill Harms at **http://users.erols.com/wharms/tis/**

The Ultimate TIS Digest contains the most current information on TIS and what everyone else is hearing so you can see where the action is. It contains FCC databases and DXer loggings. It even features TIS recordings and verification (QSL) records.

Bill says, "Unfortunately, there is a dearth of information about TIS's on the Internet. The purpose of this site is to share information and to make it available to DXers. This site features the FCC database of local government TIS's, a list of federally operated TIS's, unlisted TIS's, and a list of Canadian TIS. These lists are freely distributed for non-commercial use by TIS DXers as an aid to help them identify loggings. Just be sure to mention where you got the information."

Police Call on CD-ROM - 2000 Edition

Pozilla Software (**http://www.mghusa.com/pozilla/**), working under a joint venture with Hollins Radio Data, is pleased to announce the release of *Police Call CD-ROM - 2000 Edition*! For over 25 years, the *Police Call* books have been a staple in the scanning community. And now, after years of requests from readers, *Police Call* is now available on CD-ROM!

The long-awaited CD-ROM

frequency guide, which includes every feature of all nine printed volumes of *Police Call*, is updated and fully searchable across all volumes at amazing speed. Regular users of the *Police Call* guides will recognize all the familiar sections: If it is in the book, it is on the CD!

You will be able to use the CD to search for police, fire, medical, schools, railroads, government, aircraft, military, businesses, hospitals, trunked ID's, 10-codes, abbreviations, radio codes, the glossary of terms, maps, and much, much, more.

The CD also allows you to create a personal database of your favorite frequencies for quick recall at a later date. Users will have the ability to view their search results in a grid format or in a printable page format that is styled just like the books! You can also export your favorite frequencies to an APF file (software not included) for upload to a computer-controlled scanner.

Police Call CD-ROM is available from all fine radio stores. Grove (800-438-8155) has it for $34.95 plus $5.95 shipping.

Quebec Frequency Directory on Disk

This 3-1/2" diskette produced by Jacques Thibodeau contains over 11,700 frequency listings throughout the Province of Quebec, updated as recently as July 1999. Search requests can be made by frequency, area, or user.



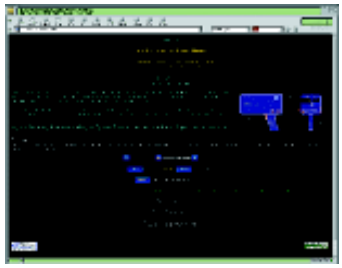
Listings include ambulance, aviation, cellular telephone, commercial, fire, police, government, utilities, military, ministry, press, taxi, towing, wireless telephone, and trunking.

Cost is $25 postpaid from Radio-Scanner Enr., C.P. 193, Lac-Megantic, PQ, Canada G6B 2S6; phone (819) 583-1817.

Traffic Radar Online

Traffic Radar Handbook by Donald Sawicki hasn't gone out of print – it's only gone onto the Web, and now it's newly expanded as well. The author says it's the most extensive document (on the web, in print, or any other media) ever composed on the subject of police traffic radar.

The site contains detailed information about microwave and laser radar including limitations,



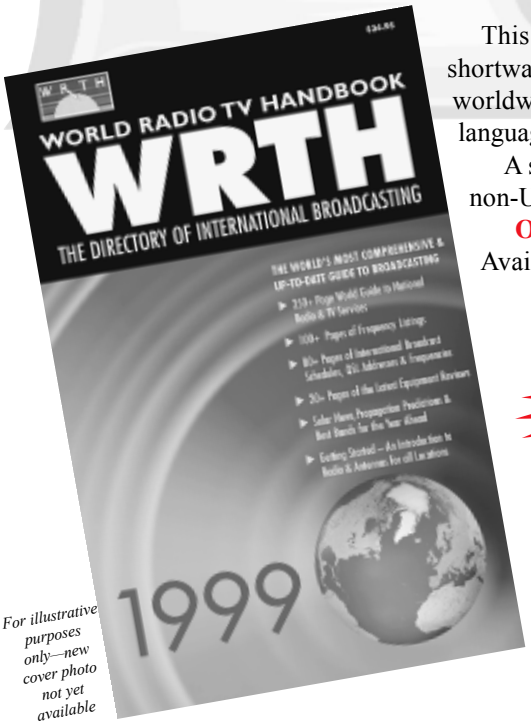
possible operator errors, and misreadings that commonly occur. The site has over 100 web pages (equivalent to approximately 300 print pages) with over 80 illustrations, 30 tables, and 18 interactive sections (including a stationary and moving radar simulator, and a site search engine).

Interactive forms customize data displayed, based on user inputs, for a particular situation using U.S. English or Metric units. Some sections require a user name and password, available for a nominal fee.

The *Traffic Radar Handbook* web site is located at **http://www.copradar.com**

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Phone Smarts for Your Scanner

If you own one of the new Bearcat TrunkTrackers that are set up for SmartScanner frequency programming, the 900 phone number provided with your scanner is now operational. Rich Barnett reports that times to download active frequencies in your area averages 2 minutes.

Barnett cautions that the service is not needed by everyone. "If you know everything you want to know for your area, then don't call. SmartScanner is not going to give you magical data that you did not know about. It's not going to program the scanner in the particular city or agency-type order that you like.

"If you're a novice or you're travelling to an area of the country you're not familiar with, then it's very worthwhile."

Watch next month's Scanning Report column for a report from Rich on how the service works and how it has performed so far.

Books and equipment for announcement or review should be sent to "What's New?" c/o Monitoring Times, P.O. Box 98, 7540 Hwy 64 West, Brasstown, NC 28902
Press releases may be faxed to 828-837-2216 or e-mailed to mteditor@grove-ent.com.

SWL Programs, *Continued from page 44*

1400 Marie Lamb via WHRI (Angel 1): "DXing with Cumbre"
1436 Radio Canada Intl: "The Mailbag"
1636 Radio Korea: "Multiwave Feedback"
1637 Radio Canada Intl: "The Mailbag"
1830 Marie Lamb via KWHR (Angel 3): "DXing with Cumbre"
1837 Radio Vlaanderen Intl: "Radio World"
1936 Radio Korea: "Multiwave Feedback"
2037 Radio Vlaanderen Intl: "Radio World"
2100 Kim Elliott via WBCQ: "Communications World ABC"
2105 BBC (am/eu): "Waveguide" (4)
2105 BBC (am/eu): "Write On"
2108 Radio Korea: "Multiwave Feedback"
2131 Radio Canada Intl: "The Mailbag"
2208 Radio Korea: "Multiwave Feedback"
2230 Marie Lamb via WHRA (Angel 5): "DXing with Cumbre"
2300 Glenn Hauser via RFPI: "World of Radio"
2331 Radio Vlaanderen Intl: "Radio World"

Mondays

0000 Radio Mexico Intl: "DXperience"
0230 Radio Korea: "Multiwave Feedback"
0231 Radio Canada Intl: "The Mailbag"
0407 Radio Canada Intl: "The Mailbag"
0430 WWCR #3 (Tennessee): "Ask WWCR"
0430 WRMI (Florida): "Wavescan"
0501 Radio Vlaanderen Intl: "Radio World"
0600 Glenn Hauser via WWCR #1: "World of Radio"
0630 Kim Elliott via WWCR #1: "Communications World ABC"
0700 Glenn Hauser via RFPI: "World of Radio"
0905 BBC (as): "Waveguide" (4)
0905 BBC (as): "Write On"
1040 All India Radio: "DX-ers Corner" (2/4)
1100 WWCR #1 (Tennessee): "Spectrum" (repeat)
1545 KTWR (Guam): "Pacific DX Report"
1840 All India Radio: "DX-ers Corner" (2/4)
2130 All India Radio: "DX-ers Corner" (2/4)
2135 Radio New Zealand Intl: "Mailbox" (biweekly)

Tuesdays

0500 WWCR #3 (Tennessee): "Ask WWCR"
0900 KTWR (Guam): "Pacific DX Report"
1330 Glenn Hauser via WWCR #1: "World of Radio"
1346 Radio Sweden: "MediaScan" (1/3)
1355 FEBC (Philippines): "DX Dial"
1446 Radio Sweden: "MediaScan" (1/3)
1846 Radio Sweden: "MediaScan" (1/3)
1900 Glenn Hauser via RFPI: "World of Radio"
2000 Polish Radio: "Polish Radio DX Club"
2000 Glenn Hauser via RFPI: "Continent of Media"
2111 Radio Havana Cuba: "DXers Unlimited"
2311 Radio Havana Cuba: "DXers Unlimited"
2340 All India Radio: "DX-ers Corner" (2/4)

Wednesdays

0000 Radio Mexico Intl: "DXperience"
0140 Radio Havana Cuba: "DXers Unlimited"
0246 Radio Sweden: "MediaScan" (1/3)
0300 Glenn Hauser via RFPI: "World of Radio"
0335 Radio Havana Cuba: "DXers Unlimited"
0346 Radio Sweden: "MediaScan" (1/3)
0400 Glenn Hauser via RFPI: "Continent of Media"
0446 Radio Sweden: "MediaScan" (1/3)
0535 Radio Havana Cuba: "DXers Unlimited"
0730 HCJB (eu): "Ham Radio Today"
0930 HCJB (pac): "Ham Radio Today"
1100 Glenn Hauser via RFPI: "World of Radio"
1200 Glenn Hauser via RFPI: "Continent of Media"
1315 FEBC (Philippines): "DX Dial"
1730 Glenn Hauser via RFPI: "Continent of Media"
1735 Radio New Zealand Intl: "Mailbox" (biweekly)
1820 Argentina, RAE: "DX'ers Special"
1820 Polish Radio: "Polish Radio DX Club"
1930 HCJB (eu): "Ham Radio Today"
2200 Glenn Hauser via WBCQ: "World of Radio"

Thursdays

0030 Australia, Radio: "Media Report"
0130 HCJB (am): "Ham Radio Today"
0239 Argentina, RAE: "DX'ers Special"
0342 Radio Budapest Intl: "Radio Budapest DX Blockbuster"
0430 HCJB (am): "Ham Radio Today"
0800 KTWR (Guam): "Pacific DX Report"
0930 Glenn Hauser via RFPI: "Continent of Media"
0953 Radio Netherlands Intl: "Media Network"
1030 Australia, Radio: "Media Report"
1153 Radio Netherlands Intl: "Media Network"
1320 Polish Radio: "Polish Radio DX Club"
1330 Kim Elliott via WWCR #3: "Communications World ABC"
1454 Radio Netherlands Intl: "Media Network"
1530 Australia, Radio: "Media Report"
1600 Radio Mexico Intl: "DXperience"
1753 Radio Netherlands Intl: "Media Network"
1954 Radio Netherlands Intl: "Media Network"
2130 Glenn Hauser via WWCR #1: "World of Radio"
2212 Radio Budapest Intl: "Radio Budapest DX Blockbuster"

Fridays

0054 Radio Netherlands Intl: "Media Network"
0453 Radio Netherlands Intl: "Media Network"
1030 KTWR (Guam): "Pacific DX Report"
1900 Glenn Hauser via RFPI: "Continent of Media"
1930 Radio New Zealand Intl: "Mailbox" (biweekly)
1930 Glenn Hauser via RFPI: "World of Radio"
2000 WWCR #1 (Tennessee): "Ask WWCR"
2047 Radio Bulgaria: "Radio Bulgaria Calling"
2200 Marie Lamb via WHRA (Angel 5): "DXing with Cumbre"
2330 Australia, Radio: "Media Report"
2338 Voice of Turkey: "DX Corner" (biweekly)

Saturdays

0005 BBC (as): "Waveguide" (4)
0005 BBC (as): "Write On"
0030 Australia, Radio: "Feedback"
0045 Radio Bulgaria: "Radio Bulgaria Calling"
0130 Marie Lamb via WHRA (Angel 5): "DXing with Cumbre"
0136 Kim Elliott via VOA (News Now): "Communications World (A)"
0300 Glenn Hauser via RFPI: "Continent of Media"
0300 Marie Lamb via KWHR (Angel 3): "DXing with Cumbre"
0330 Glenn Hauser via RFPI: "World of Radio"
0336 Kim Elliott via VOA (News Now): "Communications World (B)"
0345 Radio Bulgaria: "Radio Bulgaria Calling"
0438 Voice of Turkey: "DX Corner" (biweekly)
0500 Marie Lamb via WHRI (Angel 1): "DXing with Cumbre"
0500 Marie Lamb via WHRI (Angel 2): "DXing with Cumbre"
0515 WRMI (Florida): "Wavescan"
0536 Kim Elliott via VOA (News Now): "Communications World (A)"
0600 Marie Lamb via KWHR (Angel 3): "DXing with Cumbre"
0605 Australia, Radio: "Feedback"
0710 HCJB (eu): "DX Partyline"
0730 Marie Lamb via WHRI (Angel 1): "DXing with Cumbre"
0730 Marie Lamb via WHRI (Angel 2): "DXing with Cumbre"
0830 Marie Lamb via WHRA (Angel 5): "DXing with Cumbre"
0845 WWCR #3 (Tennessee): "Ask WWCR"
0910 HCJB (pac): "DX Partyline"
0936 Kim Elliott via VOA (News Now): "Communications World (B)"
0940 FEBC (Philippines): "DX Dial"
1100 Glenn Hauser via RFPI: "Continent of Media"
1130 Glenn Hauser via RFPI: "World of Radio"
1136 Kim Elliott via VOA (News Now): "Communications World (A)"
1230 Marie Lamb via WHRI (Angel 1): "DXing with Cumbre"
1230 Glenn Hauser via WWCR #1: "World of Radio"
1336 Kim Elliott via VOA (News Now): "Communications World (B)"
1342 Radio Tashkent: "Radio Tashkent DX Program"
1345 Voice of Turkey: "DX Corner" (biweekly)
1430 Marie Lamb via WHRI (Angel 2): "DXing with Cumbre"
1455 FEBC (Philippines): "DX Dial"
1536 Kim Elliott via VOA (News Now): "Communications World (C)"
1600 Marie Lamb via WHRA (Angel 5): "DXing with Cumbre"
1615 WWCR #1 (Tennessee): "Ask WWCR"
1700 Glenn Hauser via WRN1: "World of Radio"
1730 BBC (am/eu): "Waveguide" (4)
1730 BBC (am/eu): "Write On"
1730 Glenn Hauser via RFPI: "Continent of Media"
1736 Kim Elliott via VOA (News Now): "Communications World (A)"
1800 Marie Lamb via WHRI (Angel 2): "DXing with Cumbre"
1800 Glenn Hauser via RFPI: "World of Radio"
1909 HCJB (eu): "DX Partyline"
1936 Kim Elliott via VOA (News Now): "Communications World (C)"
2015 Voice of Turkey: "DX Corner" (biweekly)
2058 Vatican Radio: "On-the-Air"
2106 Radio Havana Cuba: "DXers Unlimited"
2110 Australia, Radio: "Feedback"
2130 Marie Lamb via WHRA (Angel 5): "DXing with Cumbre"
2131 Radio Exterior de Espana: "Radio Waves"
2136 Kim Elliott via VOA (News Now): "Communications World (B)"
2230 Marie Lamb via WHRI (Angel 1): "DXing with Cumbre"

MT REVIEW

Make Time with *KLOCKIT®*

By Ken Reitz KS4ZR

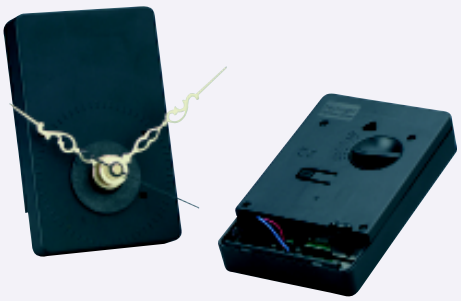
Hams and shortwave listeners have always had a need for specialized clocks. What we're looking for is a clock which is accurate, easy to read, reliable, and inexpensive. And for this reason we usually end up inheriting clocks nobody else wants. But, we're also looking for flexibility – for example, clocks with 24 hour dials, and clocks which can give us local and UTC time. Finding one which fits all these requirements isn't easy or cheap. So, why not design your own shack clock? That's where Klockit, a mail order company from Lake Geneva, Wisconsin, comes in.

Klockit caters to all manner of clock builders and hobbyists with parts and kits to build everything from $1,000 grandfather clocks to small digital clock inserts for as little as $2.80. Browsing through their 72 page catalog you'll start thinking about all kinds of neat clock projects to do for your listening post. They have several products which are perfect shack accessories:

1) The "World Time Clock Insert" lets you tell what time it is anywhere in the world. It has a 3-1/2" diameter brass outer ring with black numbers and a face which features a polar view of the world. The continents are raised and gold colored while the oceans are a dark blue. (Item #15046 $22.95)



2) "24-Hour European/Military Time with Quartz movement and dial." This insert has a 24 hour face and can be fitted with an optional sweep second hand. It can be used as a replacement dial and movement for an existing case or you build your own case. (Item #34089 6-1/2" dial $9.95 or #34090 9-1/2" dial $10.95)



3) Radio Controlled Clock Movements. Yes, these are the same movements which have the built-in receivers tuned to WWV, the National Bureau of Standards in Ft. Collins, Colorado, which "enables the movement to self-correct every day so that it always shows the exact time..." You'll need a dial and case to complete this project (just don't use a metal dial!). (Item #10087 $23.95)

Special "Radio Controlled" clock stickers for the face are available for $.75



4) Rectangle LCD Unit. Familiar digital LCD clocks in black plastic rectangular frames have setting buttons on the front. Mount two of them side-by-side and set one to local time, the other to UTC. (Item #16011 without alarm $4.95 each)

5) Brass LCD mini insert clocks. These 1-7/16" diameter LCD clocks are round with a brass bevel edge and battery included. (Item #15325 $2.80). Half a dozen of these can be lined up and inserted into a 1 x 4 with small brass plaques indicating the time zone and placed underneath for a very impressive (and very cheap) world time piece. (Klockit has brass nameplates which they'll engrave for you for $3.95 each.) A more expensive version can be made using clocks of the same size but with analog dials.



Making a stunning and useful timepiece for your listening post can be a breeze. In most cases all you'll need is a 1-inch thick piece of wood with a hole cut out to slip in the insert. For a really effective presentation go to your local building supply house and find a nice, small piece of oak, maple, poplar or other wood which will look good stained and varnished.

Cutting the circle for the insert can be done by hand with a coping saw or with an electric reciprocating saw. For precision circles you can't top Klockit's "Circle Cutter" (Item #55031 $18.95). It fits into the chuck of a drill press or hand drill to make perfect cirlces. I've used it on oak, pine, plastic, even sheet metal!

If you're a ham, you might opt for Klockit's brass nameplate and have your call sign engraved and placed under the clock to complete the custom design. This makes a great presentation gift for your local radio club, a radio friend, or your "Elmer" to whom you've been meaning to say "Thank you!"

The Klockit catalog also features three pages of analog weather instruments including thermometers, hygrometers and barometers. There's even a "tide clock kit" so you'll know when your local tides are high or low. You can customize your own weather station/clock featuring a thermometer, hygrometer, barometer, UTC and local clock all on the same board.

For a free Klockit catalog call 1-800-556-2548 or write them at P.O. Box 636, Lake Geneva, WI 53147 or visit their web site at **www.klockit.com**.

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1-3/4" SQUARE DISPLAY AD: $50 per issue if camera-ready copy or, $85 if copy to be typeset. Photo-reduction $5 additional charge. For more information on commercial ads, contact Beth Leinbach, 828-389-4007.

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FOR SALE: Lowe HF-150 with keypad, excellent condition with original box and manuals. $335 plus shipping, OBO. Consider trade for Grundig Satellit 700. 319-393-4303

WANTED: Phillips DC777 SW auto receiver, any condition. Phone/FAX 516-223-4638. Contact Earl.

Letters, continued from page 7

(the Dáil) for the opposition party, Fine Gael, to use to beat up on the majority party – calling for bans on scanners and on frequency lists. They were shocked – shocked! – that one could buy one of these sinister items anywhere! The government, led by the Fianna Fáil party, replied that there would soon be a national digital public safety communications system, which no unauthorized person would be able to listen to, anyway. I haven't seen anything further in the press about the issue since.

"Related to this was the 'Bandit' part; a newspaper got word of his website at that time, and published details. Even though there was no specific law preventing him from doing what he was doing, he has since moved his site onto a server safely within the US (it has the same content, so I believe it's the same guy) at **http://www.geocities.com/SiliconValley/Chip/5459/scanner.html**

"I infer that it is currently not illegal to use a scanner in the Republic of Ireland; but as I said, there is a push from the opposition parties to make it so. When I went to Ireland in 1997, I took a ham HT also capable of scanning (Standard C-568) and my AR-1000. A US ham license is valid in Ireland for short visits. I noted that the published lists were accurate as far as I could tell, from what monitoring I had time for.

The gardaí inside the city of Dublin itself have an interesting system: in addition to base and mobile pairs on AM midband, they have UHF NBFM control frequencies, with open carriers (so one can't scan per se), carrying both sides of the base/mobile pairs.

"If the government does go to an encrypted digital system, as mentioned in *The Irish Times*, all bets are off, of course." Thomas Mitchell, Port Angeles, WA

Your letters and comments are welcome at Letters to the Editor, Rachel Baughn, PO Box 98, Brasstown, NC 28902 or at mteditor@grove-ent.com.

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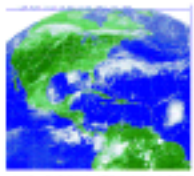
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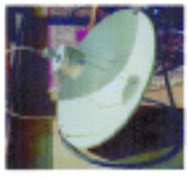
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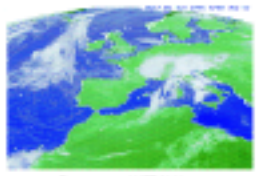
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CLOSING COMMENTS



By Bob Grove, Publisher

Looking Back as We Move Forward

It's been quite a century. We've seen wars and we've seen progress; ironically, much of the progress came from the wars. This is especially true of electronic communications. World War II was the birthing ground for miniaturization, mobile and airborne radio, coaxial cable, subcircuit integration, component standardization, and much more.

And the military surplus equipment available for amateur experimentation for pennies a pound provided endless fodder for the intellectually curious: VHF/UHF development, single sideband, repeaters, FM communications, handie-talkies, digital communications, two-way television, moonbounce transmissions, and so on.

Those of us privileged to watch this cyclonic development have seen tubes evaporate into transistors, and large circuits become integrated circuits. We've heard the drift of analog VFO's become the stability of synthesized oscillators, squawky AM radios defer to stereo-surround, and we've watched fuzzy, tiny, monochrome images become full-color home theaters.

The raucus, clackity-clack of mechanical typewriters was replaced by the hum of an electric motor before developing memory, then becoming word processors before finally(?) maturing into computers. And wow, aren't those computers growing smaller and more powerful?!

Although we've seen the eradication of many formerly fatal diseases, the extension of average life expectancy, better living conditions, and many other perks of progress, probably nothing in this century has affected mankind so pervasively as satellites and the Internet.

Instant global communications and the World Wide Web have afforded mankind a cornucopia of informational access; if anything, we now suffer from informational glut! But selectively retrieved, and coupled with objective education, knowledge is power, and there's no more power than can be found on the Internet!

...and an announcement!

MT is especially proud to be the first major radio magazine to make itself available on the Internet. That's right, beginning with the issue you hold in your hands, you can subscribe to your favorite magazine electronically! (See page 5 or go to **www.groveent.com** for details.)

Electronic subscribers to *MT Express* will have instant access to the same active utilities loggings, world hotbed frequencies, international broadcasting schedule changes, new product announcements, advertisements and more, that are found in the print version. No more late, lost, or mutilated magazines.

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Fifteen years ago we began to explore ways of making *MT* available to sight-impaired hobbyists for whom radio has become a way of seeing the world. Although some reading services occasionally read selected portions of *MT*, the entire magazine was never available on a regular basis. Now, by using a computer speech program plus the Adobe Acrobat Access Plug-in, any element of the magazine can be read aloud.

We're all very excited about this at *MT*, and know you will be, too. Although computers and the Internet have made a dent in the radio hobby, many former listeners are now coming back, and computer hobbyists are searching for other venues for their curiosity—and discovering radio! *MT* is taking advantage of this unusual alliance and using the computer and the Internet to bring radio to the world!

Anyone with Internet access, anywhere in the world, can subscribe to *MT Express* for only $19.95; if you combine it with a print subscription, it's only an additional $11!

Another century and another millennium have passed, and we are on the threshhold of continued progress. May we all benefit from this explosive growth in information technology and communications, achieving a new millennium of peaceful coexistence through knowledge and understanding.

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